# USERSGUIDEV1.1

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REX GAME STUDIOS

## INTRODUCTION

Welcome to REX Latitude ..... 5
Latitude Users Guide Layout ..... 6
Latitude Software Components ..... 7
Abbreviation Index ..... 8

## PART I: QUICK START GUIDE

First Flight ..... 9
Basic Flight Preparation & Planning Procedures ..... 10

## PART II: DESKTOP CLIENT & ONLINE PORTAL GUIDE

Desktop Client Introduction ..... 11
Home ..... 12
Operations ..... 18
Radar ..... 32
Analysis ..... 33
- Scores ..... 34
- Deduction Details ..... 37
- Charts ..... 39

Portal ..... 42
- World ..... 43
- Pilots Table ..... 45
- Pilot Select ..... 47
- Flights Table ..... 49
- Flight Select ..... 50
- Earnings Details ..... 52

Settings ..... 56

## PART III: SCORING & FLYING GUIDE


Observation .....57

Skill & Comfort Scoring
- Introduction.....59
- Perceptual Based Scoring .....60
- Scoring Criteria .....62
- Metric Scoring Impacts.....63

Phase 1 - Takeoff
- Takeoff Introduction .....64
- Takeoff Diagrams .....64
- Scoring Duration .....66
- Metric Parameters .....66
- Takeoff Tips.....67

Phase 2 – Enroute
- Enroute Introduction .....68
- Enroute Diagrams .....69
- Enroute Tips.....69
- Metric Parameters .....71
- Enroute Segments
  - a) Climbs.....72
  - b) Level .....75
  - c) Descents .....76

Phase 3 – Approach
- Approach Introduction .....77
- Approach Diagrams .....78
- Metric Parameters .....83
- Approach Tips .....83

Phase 4 – Landing
- Landing Introduction .....84
- Landing Diagrams .....85
- Metric Parameters .....86
- Landing Tips.....87

General Scoring Tips .....88

Comfort Scoring.....89

## PART IV: CAREER, REPUTATION & ECONOMY GUIDE

Portal Introduction ..... 90
Career Levels ..... 90
- Promotions ..... 91
- Demotions ..... 93

Experience ..... 94
Reputation ..... 95
Economy
- Introduction ..... 96
- Plan Routes ..... 97
- Payload ..... 98
- Revenue ..... 100
- Fuel Costs ..... 101
- Operational Costs ..... 105
- Fixed Costs ..... 107
- Bonuses & Penalties ..... 109

**PRODUCT SUPPORT** ..... 111

*Latitude is the epitome of fun and excitement on all your flights. No more inconsequential landings; no more ordinary routes. Imagine an objective unbiased observer on every flight to ensure your actions matter; this is Latitude.*

*Immerse yourself in a multiplayer pilot community where you can climb the career ladder, build a solid reputation and earn a living. Latitude offers all this and more! Share your flights for all to see while competing on your own terms.*

*Whether it's low and slow or fast and high, pristine, calm days or thunderous gusty nights, you can customize your experience to your exact liking and find others that share your passion. You don't have to change anything about how you fly, but you'll want to.*

You are about to enjoy the ultimate customizable experience in the flight simulation world. REX Latitude will bridge the gap between flight simulation and real world flying. For some, simming is all about the possibilities of flying a plane any time, in any geographical location; for others it's about learning aviation principles or used as a stepping stone to an aviation career; for some folks it's about socializing with like minded enthusiasts and then there are those that use flight simulation to hone their real-world flying skills. Latitude allows you to focus on your existing simming needs but makes the simming experience feel entirely realistic. Pilots tend to have an intrinsic thirst to dig for aviation knowledge and to be the best they can be. Latitude will allow you to explore the expansive concepts of many aviation aspects but with the flexibility to allow you to dictate where you take your flight simulator experience. REX Latitude brings your vision to life.

REX Latitude was born out of a desire to get the most from the flight simulator by turning the simulation experience into something where every flight adventure provides insight and reflection. Behind the scenes, Latitude will collect an array of data and present you with unbiased evidence of where you, the pilot, has adhered to, or deviated from, good piloting skills. However, Latitude goes beyond just pilotage. It lends itself to many aspects of real world aviation including flight planning, aircraft loading, aircraft performance and weather conditions.

What REX Latitude is not is a 'how to fly' add-on. It offers a wealth of information on actual flying techniques, rules and regulations, but will not teach the core concepts of pilotage. Latitude should be considered a tool to aid your progression to becoming a better, well-rounded pilot. Latitude's effectiveness is predicated on the understanding that the pilot has a fundamental knowledge of aerodynamic principles and general aircraft operations. If you don't have understanding of these concepts, you should first use the resources available within the simulator to grasp these basic concepts. If you have acquired an understanding of general aviation principles, then it's time to put the old adage "practice makes perfect" in the spotlight. Latitude will pinpoint your individual flying weaknesses and help you focus on which concepts to explore in more detail.

In Latitude your flight simulator decisions and subsequent actions matter. There will be consequences to ill-advised actions like flying beyond an aircraft's operating parameters, flying into airfields that are too short, inadequate fuel or weight planning or flying in adverse weather conditions without proper planning. But, if your flight is performed well, you will be rewarded. All the while you will learn without the rigid repetitive nature of lessons in either a solo or multiplayer environment. Latitude will hold your attention and keep you on the edge of your seat. Immerse yourself into Latitude and your flying will never be the same.

**Ready? If so, fuel the plane, jump into the pilot seat and buckle up! It's time to take your simulation to the next level with REX Latitude.**

**REX Latitude encompasses complex concepts and delivers abundant content in a very simple, easy-to-use format. In fact, there is nothing for the pilot to configure prior to installation nor during Latitude's use. Simply install the application, launch and fly. There are various aircraft parameters that can be configured within the Latitude desktop client if desired or required, however, for most purposes it's a 'launch and fly' process.**

**If you fly with Latitude running, it will examine your flights from takeoff to touchdown and then provide you with feedback about how your flight was conducted. Understanding both what Latitude is observing as you conduct your flight and understanding the resulting critique of your flight, will help you become an all around better pilot. Understanding how your flights integrate into Latitude's competitive multiplayer environment will help you more rapidly ascend the career ladder, gain reputation and improve your financial status. Latitude is rich in content and multiple faceted. Therefore, this users guide is segmented in a way to help you learning all Latitude has to offer in a manageable way. The primary User's Manual parts are:**

**PART I: Quick Start Guide**

**PART II: Desktop Client & Online Portal Guide**

**PART III: Scoring & Flying Guide**

**PART IV: Career, Reputation & Economy Guide**

Latitude is simple to use. Some of you may only read the Quick Start Guide and never come back to the other guides within this manual. Others may find themselves wanting to dig deeper into what Latitude is doing behind the scenes. You may want to know precisely what Latitude is looking for during observation and how to propel yourself upward against the ranks of your fellow simmers. If you are one of those people, and likely you are by virtue of your interest in Latitude, parts III and IV of this manual are for your reference. *Let's get started.*

There are two basic components to Latitude.

**Desktop Client**
**Online Portal**

The desktop client is the application that resides on your local simulator machine or client machine. The online Portal is Latitude's online interface that can be viewed from any internet connect computer or smart device. Installing the desktop client is a simple process: double-click the installation wrapper, select your preferred install location and let Latitude do the rest. Latitude is a small application and can be installed in any location, including a remote machine on the same network. Latitude will automatically locate FSX / P3D via SimConnect. No special port settings or configurations are needed to get the Latitude and FSX / P3D to communicate.

## DESKTOP CLIENT

This is the software component that interfaces with FSX / P3D. It collects all the data about your flight and presents an array of analytical information during and after your flight. The desktop client will calculate your pilot skill score, passenger comfort and provide analytical charting of your flight. Latitude also functions as an active fuel and payload manager prior to departure and can be used as the interface to the Online Portal.

The pilot needs to only start the application to interface with FSX and begin collecting data. Although Latitude won't do the flight planning for you, once it is launched, it is ready for flight. You can start the desktop client any time prior to departing on your flight. Since Latitude contains options relating to fuel and passenger loading, it will typically be launched earlier in the flight planning process rather than just prior to taking off. The data collected during a flight and resulting analysis is stored on your local computer and can be recalled at any time for review.

## ONLINE PORTAL

The Online Portal component of Latitude is what connects you to the online multiplayer community and opens you up to a whole new simming world. The Portal is integrated in the desktop client but you can also visit the Portal at http://www.rexlatitude.com. There is no additional software needed to use the online portal. With a click of a button the flights of your choosing will be uploaded to the online database. From the Portal you can measure your skills against other pilots based on aircraft families, flight types (charter / ferry / pattern), day and night flying, weather (VFR/MVFR/IFR/LIFR) and wind conditions. You will build a career, gain a reputation, make money and with enough skill, land on the portal leader boards.

The Portal is the catalyst for flying better. It is a great way to track your progress as you become a better pilot, with a permanent record of when, where and how you have performed. The rate at which you hone your skills and what flights you share is entirely up to you. It is encouraged that you participate in the online Latitude community, not only for the fun of it, but also for the real-world experience you're sure to gain.

| | |
|---|---|
| **AGL** | Above Ground Level |
| **HAL** | Height Above Liftoff |
| **HAT** | Height Above Touchdown |
| **MFW** | Maximum Fuel Weight |
| **MLW** | Maximum Landing Weight |
| **MPW** | Maximum Payload Weight |
| **MTOW** | Maximum Take Off Weight. The maximum weight at which the pilot of the aircraft is allowed to attempt to takeoff due to structural or other limitations. |
| **MZFW** | Maximum Zero Fuel Weight (MZFW = OEW + MPW) |
| **OEW** | Operational Empty Weight |
| **PW** | **Payload** Weight |
| **Vs** | Stalling speed or minimum steady flight speed for which the aircraft is still controllable |
| **Vs0** | Stall speed or minimum steady flight speed in landing configuration |
| **Vs1** | Stalling speed or minimum steady flight speed for which the aircraft is still controllable in a specific configuration |
| **Vd** | Demonstrated flight diving speed |
| **Vdn** | Touchdown speed |
| **Vlf** | Liftoff speed |
| **Vmd** | The speed that results in the lowest rate of sink in a power-off glide, providing the longest time in the air from the potential energy of height |
| **Vne** | Never exceed speed |
| **Vno** | Maximum structural cruising speed or maximum speed for normal operations |
| **ZFW** | Zero Fuel Weight (ZFW = OEW + PW) |

It's easy to get started. REX Latitude allows you to simply install and fly! After you have completed a few flights, you will begin to develop a routine that fits the type of flying you like to do. You may find the analytical view of your flight is all you need. You may also find that participating online motivates you to be the best pilot you can be. Before you decide how to best utilize Latitude in your simulator environment, let's log the first flight using Latitude.

**FIRST FLIGHT**

1. **Launch Latitude and make sure it's connected**
2. **Go fly**
3. **Land at your destination and come to a complete stop**
4. **Scores for the flight will automatically be displayed in FSX and on the desktop client**
5. **Review your scores**

Congratulations – you just completed your inaugural flight with Latitude! You may have many questions about your scores after your first flight. Don't fret, the more comprehensive Part III: Flying Guide, will help you gain clarity and understanding of Latitude's observation techniques and scoring system. It may take several flights to fully comprehend the information Latitude presents and to how to learn from what it's telling you. Your future flights may require more complex comprehension of flight planning and aircraft configuration depending on how you utilize Latitude. If Latitude is only an analytical tool, fuel and payload loading may not be as critical. However, if you also participate with the online community, all aspects of flight planning should be incorporated into your pre-flight routine. If you participate in the multiplayer environment, your path to a successful experience is simple:

**Fly Well = Good Scores**
**Good Scores = Advance Career**
**Advanced Career = Better Earnings**

As you can see, flying well is the primary goal and delivers good skill and comfort scores. The scores are the underpinnings to your online success. If you fly poorly, all other Latitude aspects such as your career level, reputation and financial success will suffer - just like the real world. How to fly well goes far beyond a takeoff and landing. The pilot must plan for and anticipate events that can occur during the course of a flight. Planning ahead means the pilot must review and understand specific factors prior to taxiing to the runway. Aircraft performance requirements, aircraft loading and weather will all impact your flight performance. To make these concepts more manageable, it's recommended that you take a step-by-step approach to understanding the concepts. A successful pilot understands the following concepts:

1. **Preparing Well -** Understanding the Operations Page
2. **Planning Well -** Understand your route and weather
3. **Fly Well**

It makes sense to learn the topics in that order. If you don't know how to properly operate the aircraft and the aircraft's relationship to the desktop client *options page,* it's difficult to plan well. If you do not adequately plan, it's difficult to fly well and to 'stay ahead' of the aircraft. To have an all around successful flight, these concepts will need to be addressed before and during your flight. If you plan on flying for the analytical scores only, the fuel and payload loading may not be as critical. However, if attention is given to all three of these aspects, they will help you propel up the career ladder and leader boards, gain reputation and maximize profits. The specific guides within this users manual will provide you a better understanding on how to best address preparing well, planning well and flying well.

Although you can "Launch & Fly" with Latitude, you will find that basic flight preparation and planning will increase the likelihood of achieving better scores and online experience. After the first couple of logged flights, the procedures taken within Latitude may look something like the following:

**BASIC FLIGHT PREPARATION AND PLANNING PROCEDURE**

1. **Launch Latitude**
2. **Check weather conditions along route / review winds aloft (REX Essentials)**
3. **Plan route to minimize fuel burn given standard flight planning procedures**
4. **Input route information (See Part II – Desktop Client Guide)**
5. **Verify runway lengths for departure & arrival airfields**
6. **Load fuel according to minimum route fuel required +1 hour reserves (See Part II – Desktop Client Guide & Part IV – Career, Reputation & Economy Guide)**
7. **Load passengers and/or cargo**
8. **Verify maximum takeoff weights (MTOW, MLW, MPW)**
9. **Configure flap conditions for aircraft to determine takeoff and landing speeds**
10. **Crosscheck aircraft parameters with POH or FMS (See Part II – Desktop Client Guide)**
11. **Takeoff and fly according to aircraft performance specifications**
12. **Check landing weight & touchdown speeds**
13. **Land, taxi to gate and review scores**
14. **Upload flight for career, reputation and earnings (see Part IV: Economy Guide)**
15. **Compare your flight to other flights (See Part II: Portal Guide)**

If the procedures are followed above with planning and flying accuracy your scores will be favorable. If shortcuts are taken and steps are skipped, there is a good change the flight will result with less than favorable results. How one measures a flight's degree of success depends on the pilot. For some anything less than 100% is a failure. For other pilots, just getting the plane on the ground without crashing is successful. Latitude uses 50% as the benchmark to measure a flight's degree of success. 50% is "fair" or "average". Above 50 %, your flight is better than average. Less than 50%, your flight was less than average. If you find that your scores are consistently less than average, reference the Scoring & Flying and Desktop Client guides for clues as to what you may be missing from your procedure process and flying logic.

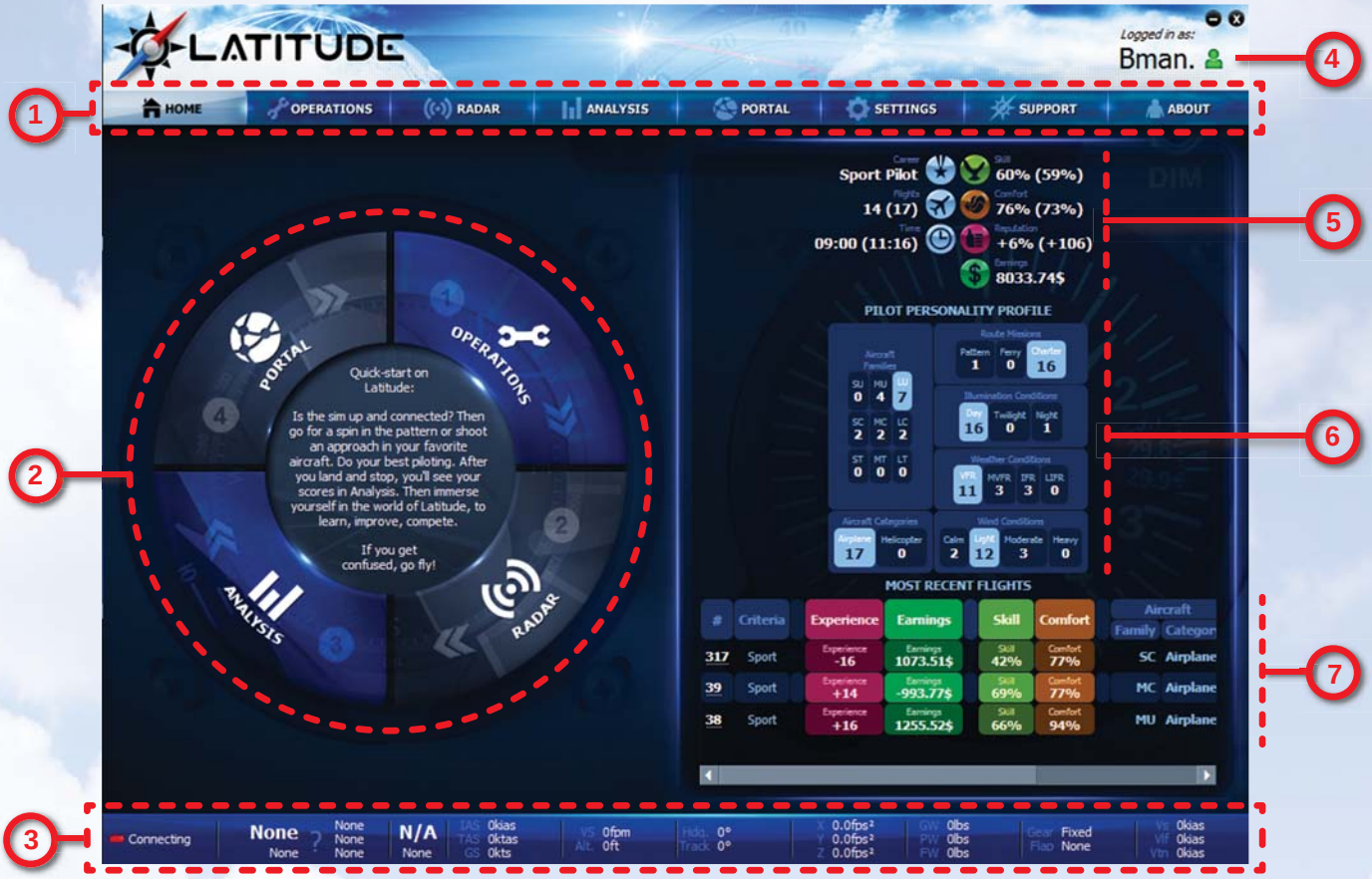
## IMPORTANT NOTE:

Latitude uses 50% as the benchmark to measure a flight's degree of success. 50% is "fair" or "average". Above 50 %, your flight is better than average. Less than 50%, your flight was less than average. If you find that your scores are consistently less than average, reference the Scoring & Flying and Desktop Client guides for clues as to what you may be missing from your procedure process and flying logic.

This section of the manual covers specific Latitude features, user interface and Portal functions. Understanding what Latitude displays is the key to learning *from* Latitude. The flight analysis pages depicting your first couple flights may appear very foreign at first. Spend some time in both the cockpit and digesting your analytical scores to yield a better understanding of how your flight was conducted and how to improve your next flight. With experience, you will arrive at the point where you're predicting your flight summary with accuracy, even before looking at the scoring and earnings outcomes displayed within the desktop client.

This section of the guide will walk you through each page of the user interface, with accompanying screenshots highlighting important areas within the GUI. Not all areas of the user interface contain descriptions; however, hovering your mouse on much of the information within the GUI displays a pop-up description providing the necessary detail.

## HOME



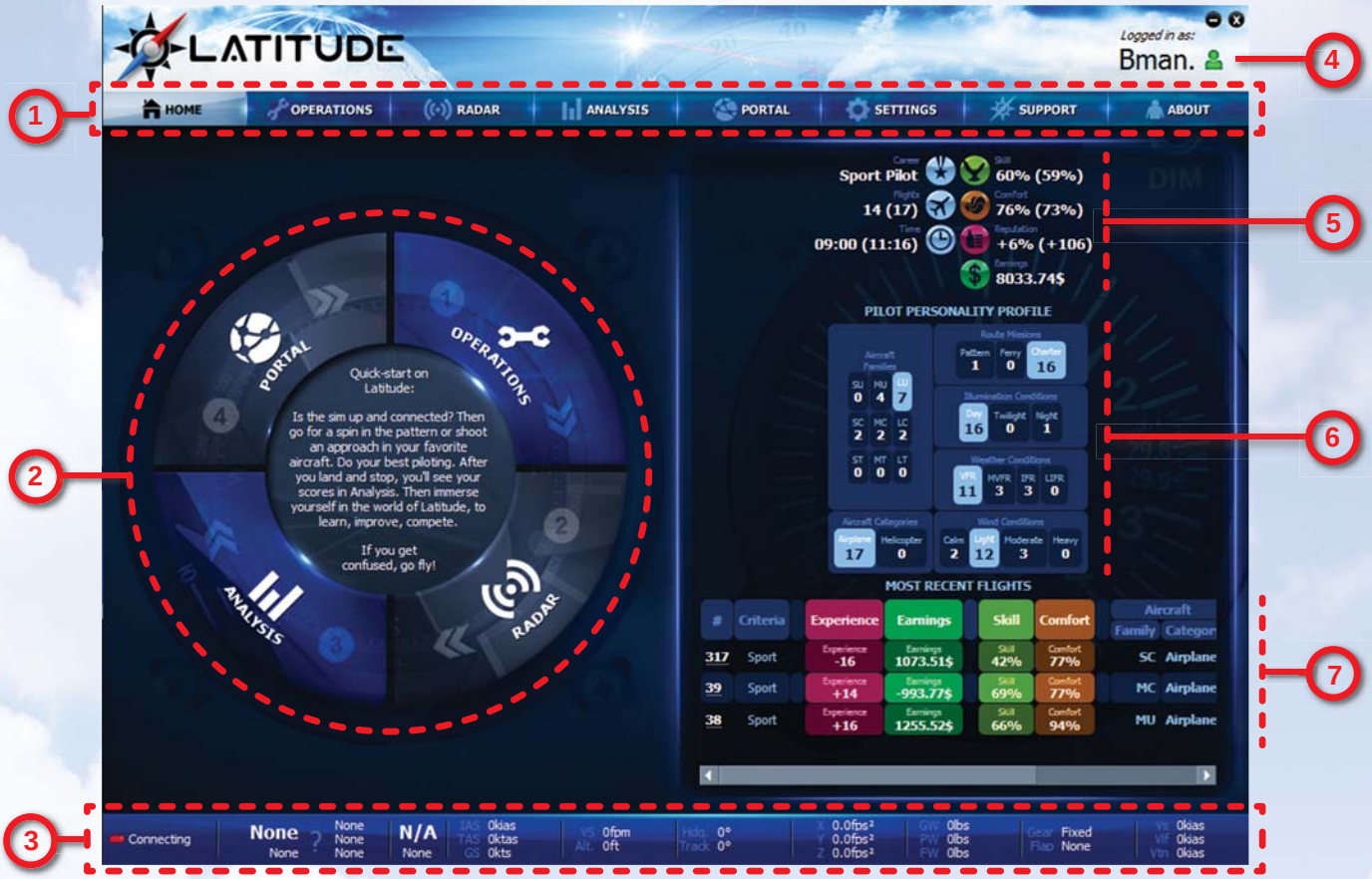

The **HOME** page is the pilot "Dashboard" encompassing Latitude's navigation tabs, achievements, earnings, **Pilot Personality Profile** as well as your most recent Portal flights. The primary components of the **HOME** page include:

**1** **Navigation Bar** – Selecting tabs on the navigation bar will direct you to various components within Latitude. These pages include:

| | |
|---|---|
| **HOME** | |
| **OPERATIONS**: | Preflight Planning |
| **RADAR**: | Map & Chat |
| **ANALYSIS**: | Scores & Charts |
| **PORTAL**: | Online Career, Reputation and Economy |
| **SETTINGS**: | Adjustments to program behavior |
| **SUPPORT**: | Support links to technical support and forums |
| **ABOUT**: | About REX Latitude – version & contact information |

The **Navigation Bar** is visible on all pages within Latitude.

**HOME** *(continued)*




**2** **Quick Start Dial** – This is a quick launch dial for the **primary** navigation tabs. Hovering the mouse cursor over each quadrant will display a brief summary of each navigation tab function. Clicking on a quadrant navigates you to the selected area of the program.

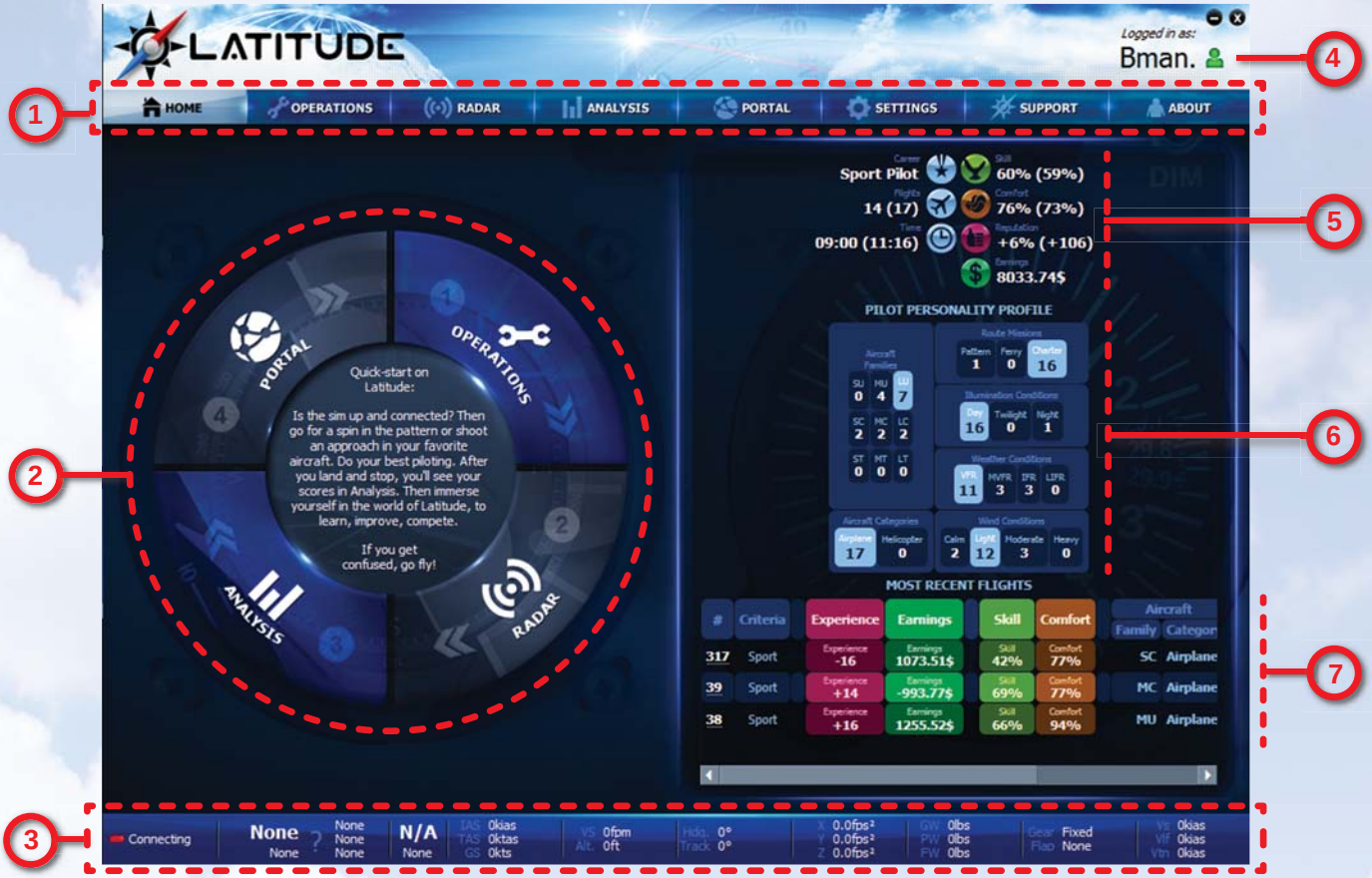
**HOME** *(continued)*

LATITUDE
Supplied credential is invalid.
Not logged in.
HOME
OPERATIONS
RADAR
ANALYSIS
PORTAL
SETTINGS
SUPPORT
ABOUT
Quick-start on Latitude:
Is the sim up and connected? Then go for a spin in the pattern or shoot an approach in your favorite aircraft. Do your best piloting. After you land and stop, you'll see your scores in Analysis. Then immerse yourself in the world of Latitude, to learn, improve, compete.
If you get confused, go fly!
THE WORLD OF LATITUDE AWAITS YOU
Can you fly better? Find out.
Sign Up
TOP PILOT LEADER BOARDS
TOP FLIGHT LEADER BOARDS
Connecting

**!!** **Not Logged In Status** – If the right side of the Home page displays "Not Logged In", this means that you are not currently logged on to the Portal. The information displayed on the right half of the Home page relates to online career, reputation and economy. If you are not logged on to the Portal, your Pilot Personality Profile and recent flights are not indicated. If you are new to Latitude and wish to participate in the multiplayer environment, click the **Sign Up** button. Come and join the online fun. The world of Latitude awaits you!

If you have already signed up for Portal access and this page does not display your Portal pilot dashboard, check your login credentials under the Setting tab.

**HOME** *(continued)*



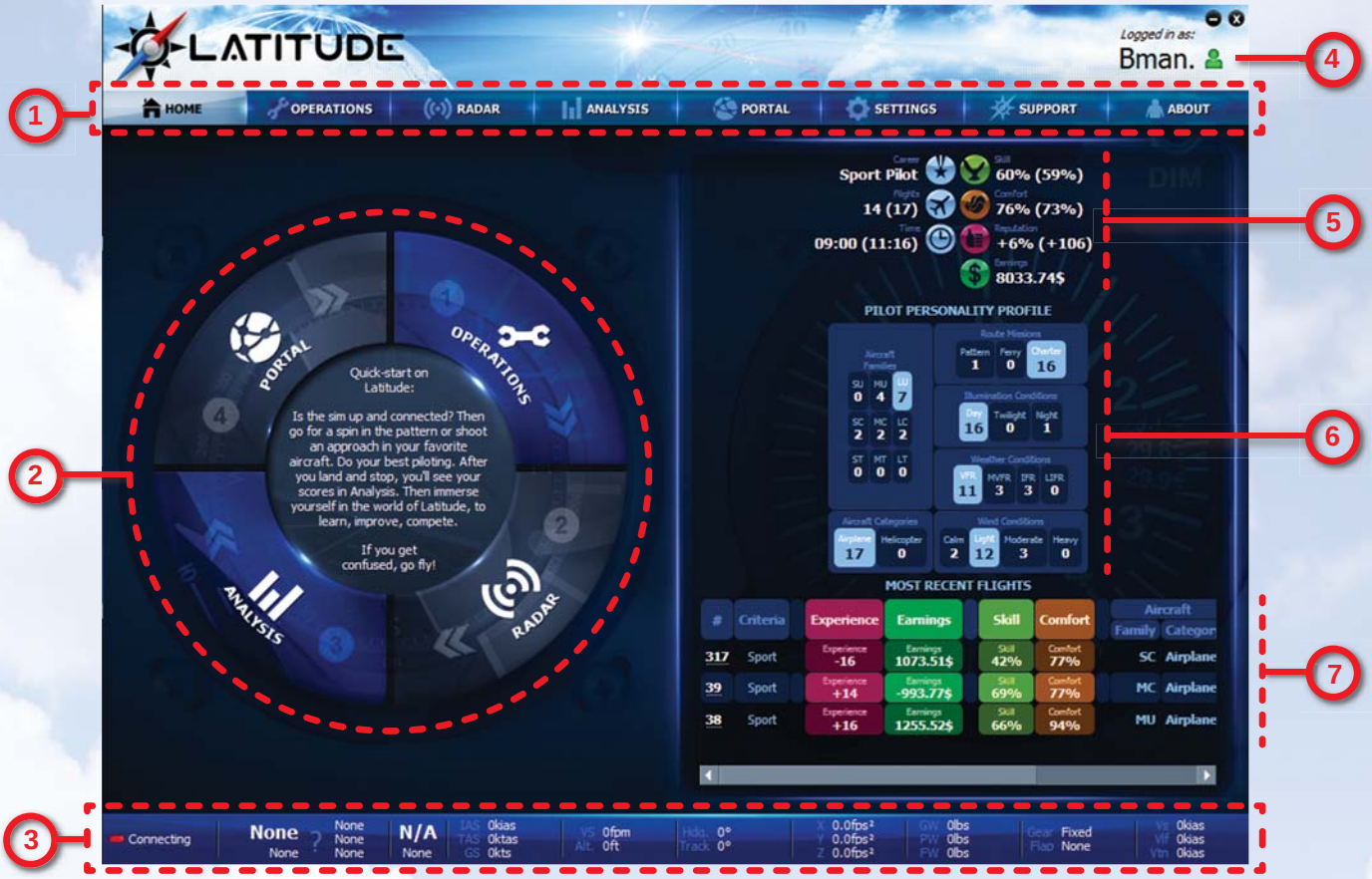

**3** **SimConnect Information Panel** – Displays the current FSX connection status, weather and aircraft statistics. This information is a real-time data feed between FSX via SimConnect. The FSX connection status colors indicate:

| | |
|---|---|
| **RED** | Not Connected to FSX |
| **YELLOW** | Connected – observing |
| **GREEN** | Connected – recording |

While in-flight, referencing the S**imConnect Information Panel** provides many clues to performing a good flight. Additional information displayed from left to right within the SimConnect Information Panel are as follows:

- Nearest Airport and Weather Conditions
- Aircraft Type and surface type below the aircraft
- Current IAS, TAS and GS
- Vertical Speed and Altitude
- Heading and Track
- Accelerations in the X *(left / right)*, Y *(up / down)* and Z *(forward / backward)* directions
- Gross Weight, Passenger Weight, Fuel Weight configuration
- Gear and Flap Conditions
- Vs *(stall speed)*, Vlf *(liftoff speed)* and Vtn *(touchdown speed)*

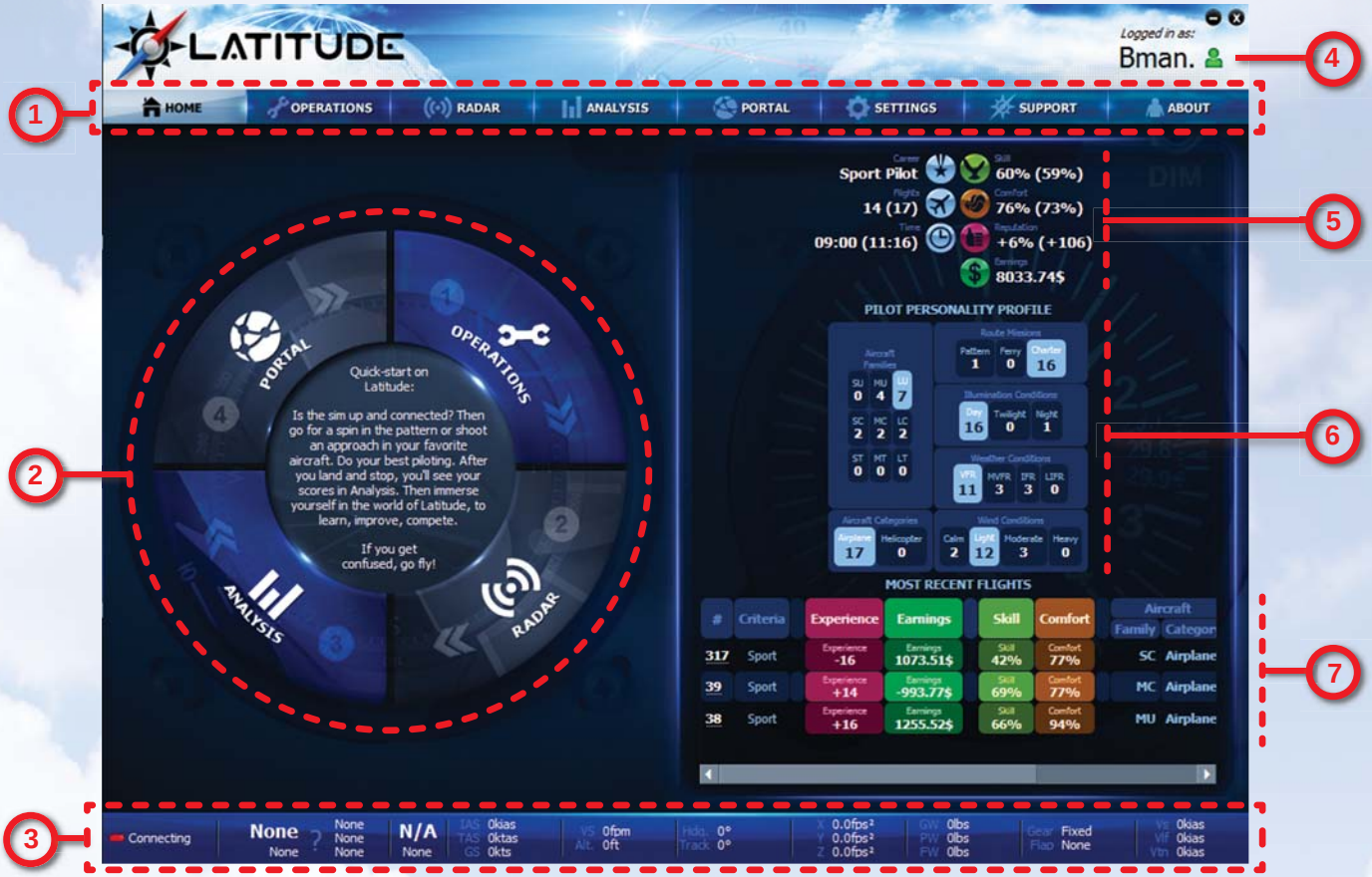
**HOME** *(continued)*




**4** **Portal Status** – This area displays whether or not you are connected to the **Portal**. **Red** indicates no connection, **green** indicates connected. Selecting the icon will open the **ACCOUNT** page where you may sign up for the **Portal** or modify your account details. Access to the **Portal** is limited to Latitude users that have input a valid **License Key** within the "account details" on the **Settings** page.

**5** **Pilot Portal Statistics** – This area displays your total overall statistics from the **Portal**, including your Career Level, Total Skill & Comfort Scores, Total Flights and Flight Time, Reputation and total Earnings. ONLY pilots who participate within the online **Portal** will have complete data.

**HOME** *(continued)*



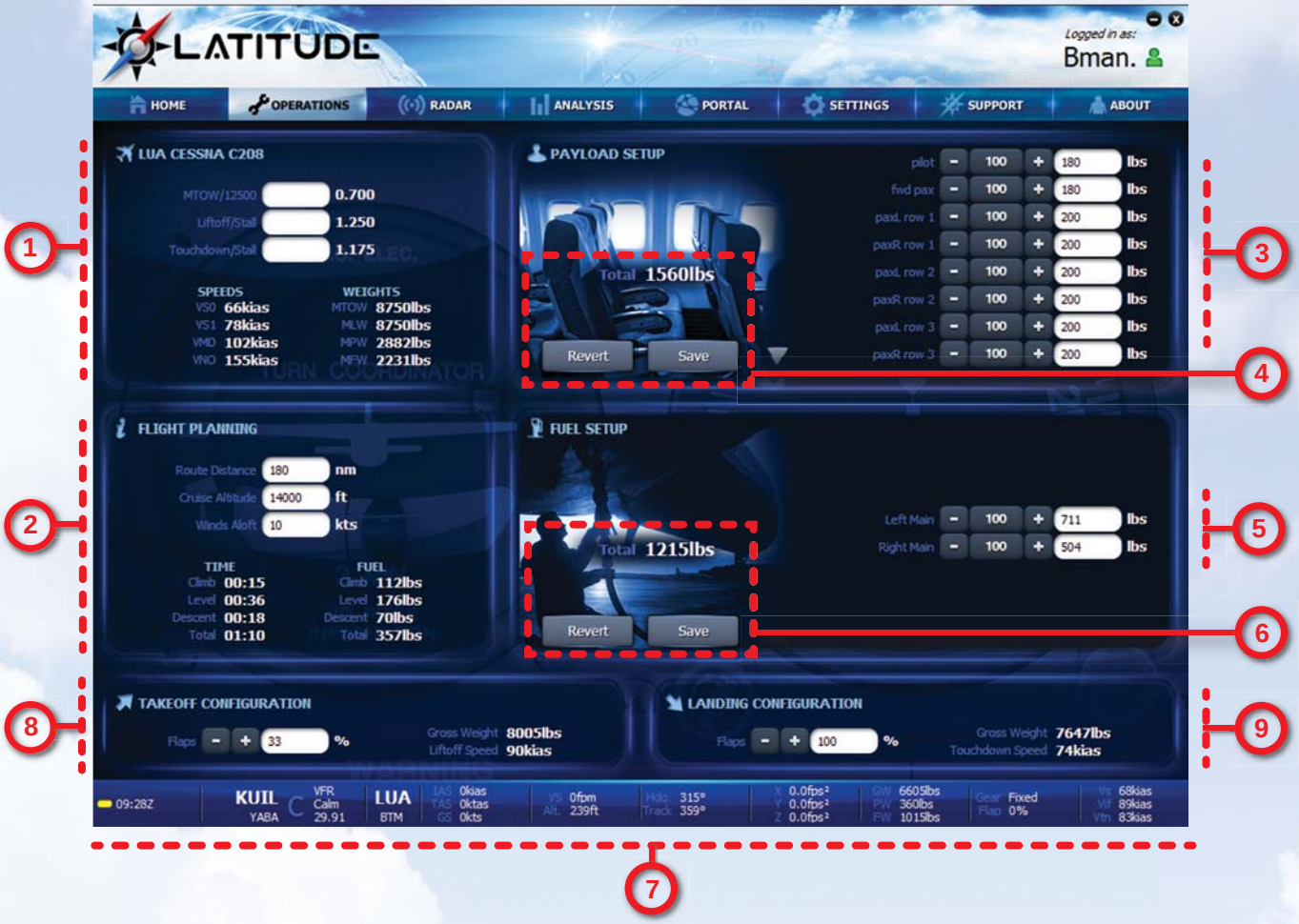

**6** **Pilot Personality Profile** – Represents the pilots mix of aircraft family type, day/night flights, route types, cloud conditions *(based on a blend between takeoff/landing)* and wind conditions. This area defines what type of pilot you are. Each time a flight is uploaded to the **Portal**, the **Pilot Personality Profile** updates to reflect your current statistics.

The **Aircraft Family** types are distinguished by the following weight classes:

| | |
|---|---|
| **SU** (Small Utility) | 0 ~ 3125 lbs |
| **MU** (Medium Utility) | 3126 ~ 6250 lbs |
| **LU** (Large Utility) | 6251 ~ 12,500 lbs |
| **SC** (Small Commuter) | 12,501 ~ 25,000 lbs |
| **MC** (Medium Commuter) | 25,001 ~ 50,000 lbs |
| **LC** (Large Commuter) | 50,001 ~ 100,000 lbs |
| **ST** (Small Transport) | 100,001 ~ 250,000 lbs |
| **MT** (Medium Transport) | 250,001 ~ 500,000 lbs |
| **LT** (Large Transport) | 500,000 + lbs |

**7** **Most Recent Flights** – Displays your recent flights uploaded to the **Portal**.

## OPERATIONS

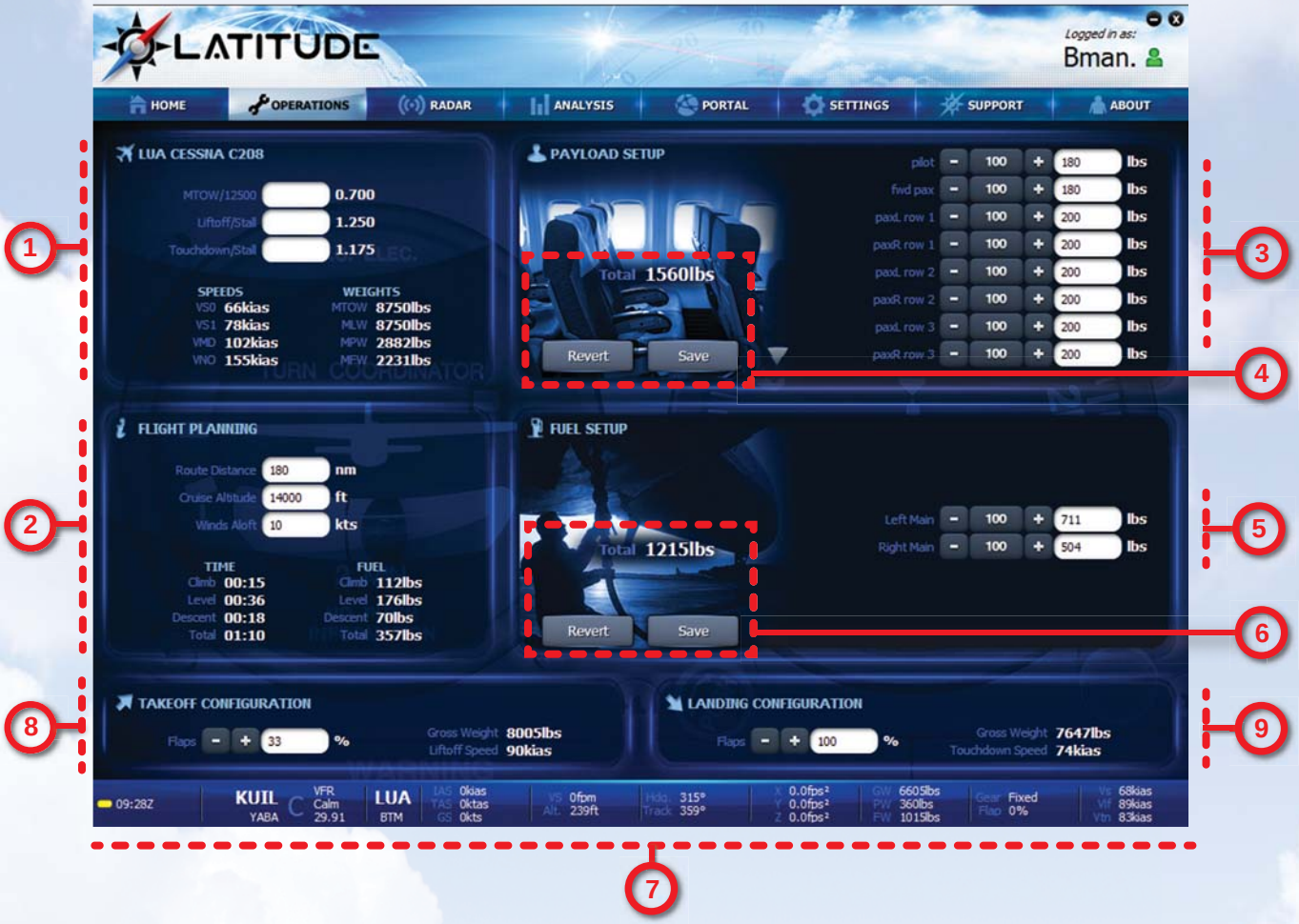



The **Operations** page potentially plays an important role in how Latitude scores your flights as well as providing you vital information to review and employ during your flight. This area is an important tool during your preflight planning stages to assure that you're prepared to achieve the highest scores possible. You're able to verify your payload, fuel, flap configuration and Vspeeds associated with takeoff and landing. **It's critical to understand that most of the information displayed on this page is the same information in FSX. The values displayed are provided to Latitude from FSX via SimConnect**.

## IMPORTANT NOTE:

If at any time the information provided from this page does not correlate to known aircraft configurations set within FSX, something is amiss and should be investigated further prior to departure. The information displayed here is directly tied to how Latitude will judge your flight under both **Skills** and **Earnings**. Become familiar with this page and use it as a tool for your pre-planning and "cross check" of aircraft parameters that have been set through a different programs such as *FSX or 3rd party add-ons*.

## OPERATIONS *(continued)*

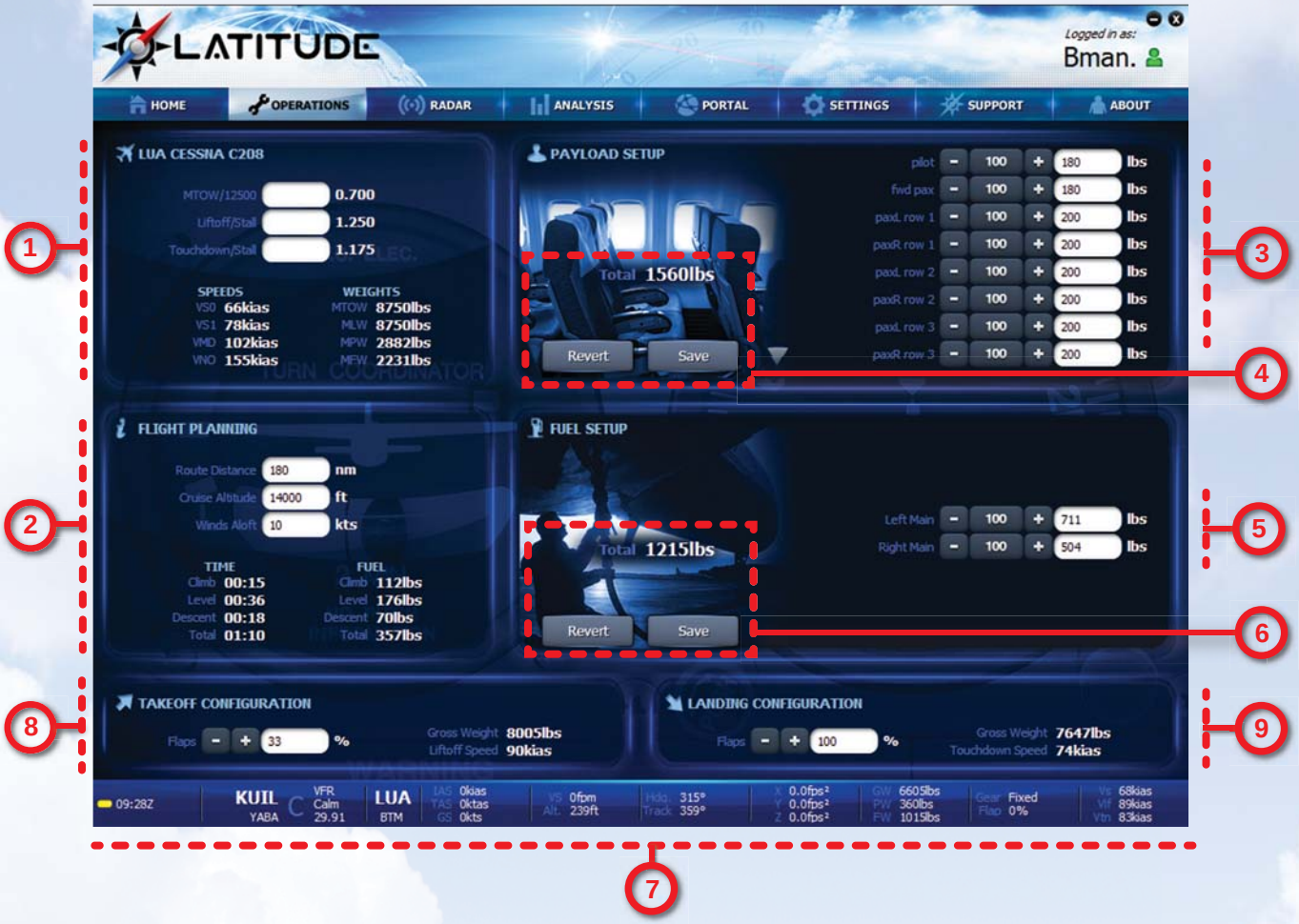



**1** **Aircraft Parameters** – An important aspect Latitude must contend with is how aircraft within FSX have been modeled. Latitude bases liftoff and touchdown speeds on aircraft weight and stall speeds. If these stall speeds are incorrect, or incorrectly provided by FSX, the liftoff and touchdown speeds will be incorrect and may need adjustment. This usually is not the case as most aircraft provide accurate data. Aircraft parameter adjustments are only required when predicted liftoff and touchdown speeds don't match POH or FMS speeds.

## IMPORTANT NOTE

The aircraft parameters (area noted adjacent to #1 only) should not be altered unless the stall speed values are incorrect, or incorrectly provided by FSX, the liftoff and touchdown speeds will be incorrect and may need adjustment. This usually is not the case as most aircraft provide accurate data. Aircraft parameter adjustments are only required when predicted liftoff and touchdown speeds don't match POH or FMS speeds.

**OPERATIONS** *(continued)*




The stall speed logic and how it relates to the aircraft Liftoff/Stall and Landing/Stall speeds can be complex. The short explanation is that all planes have touchdown and liftoff speeds based on stall speeds relative to the aircraft weight. However, the smaller the airplane, the less variation in weight matters.

Before discussing the liftoff/stall and touchdown/stall ratios, let's review the critical Vspeeds:

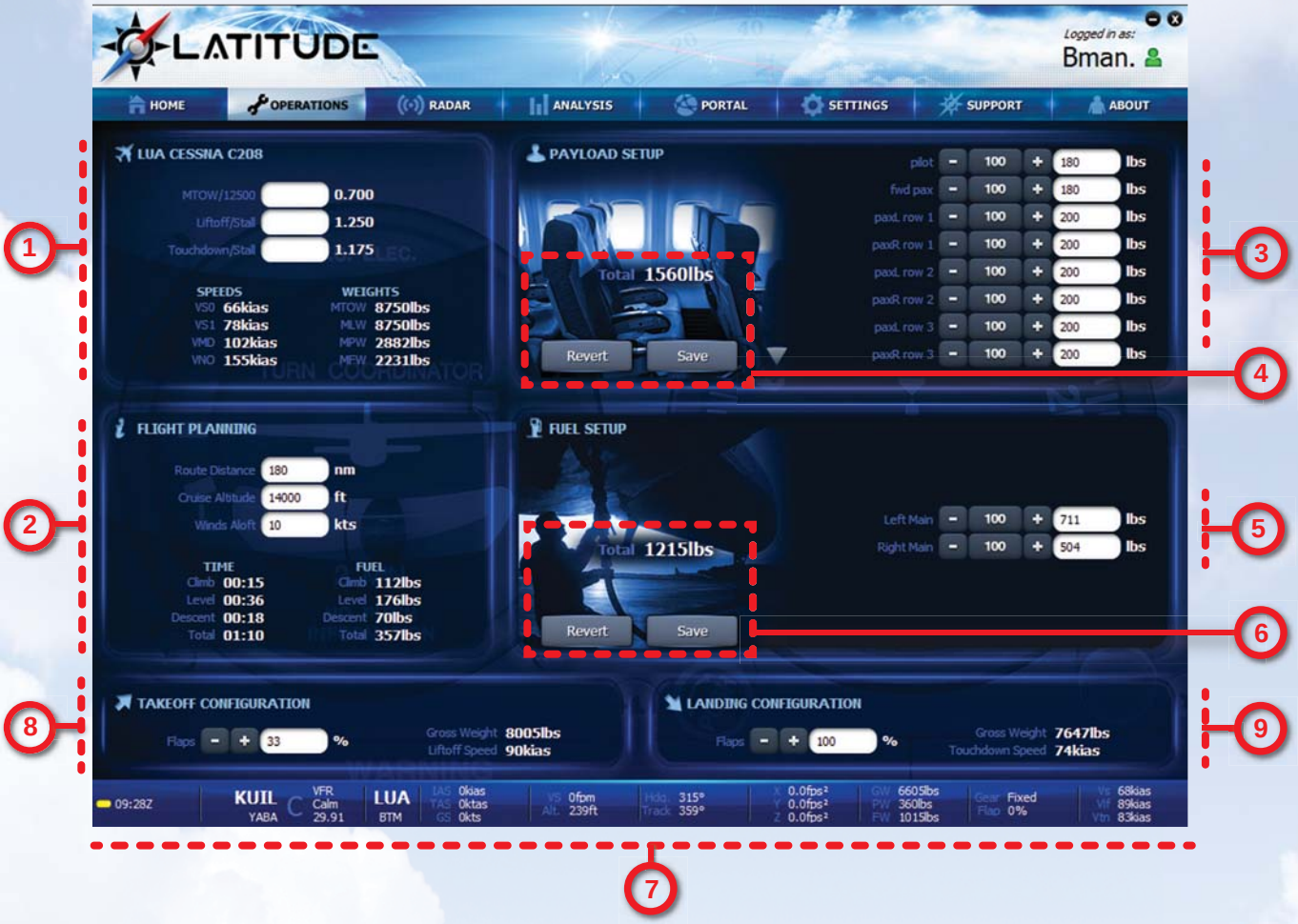
**Vr** Rotation Speed

**Vs0** Stall speed or minimum flight speed in landing configuration

**Vs1** Stall or minimum steady flight speed for which the aircraft is still controllable in a specific configuration.

**V2** Takeoff safety speed. The speed at which the aircraft may safely become airborne with one engine inoperative.

**OPERATIONS** *(continued)*

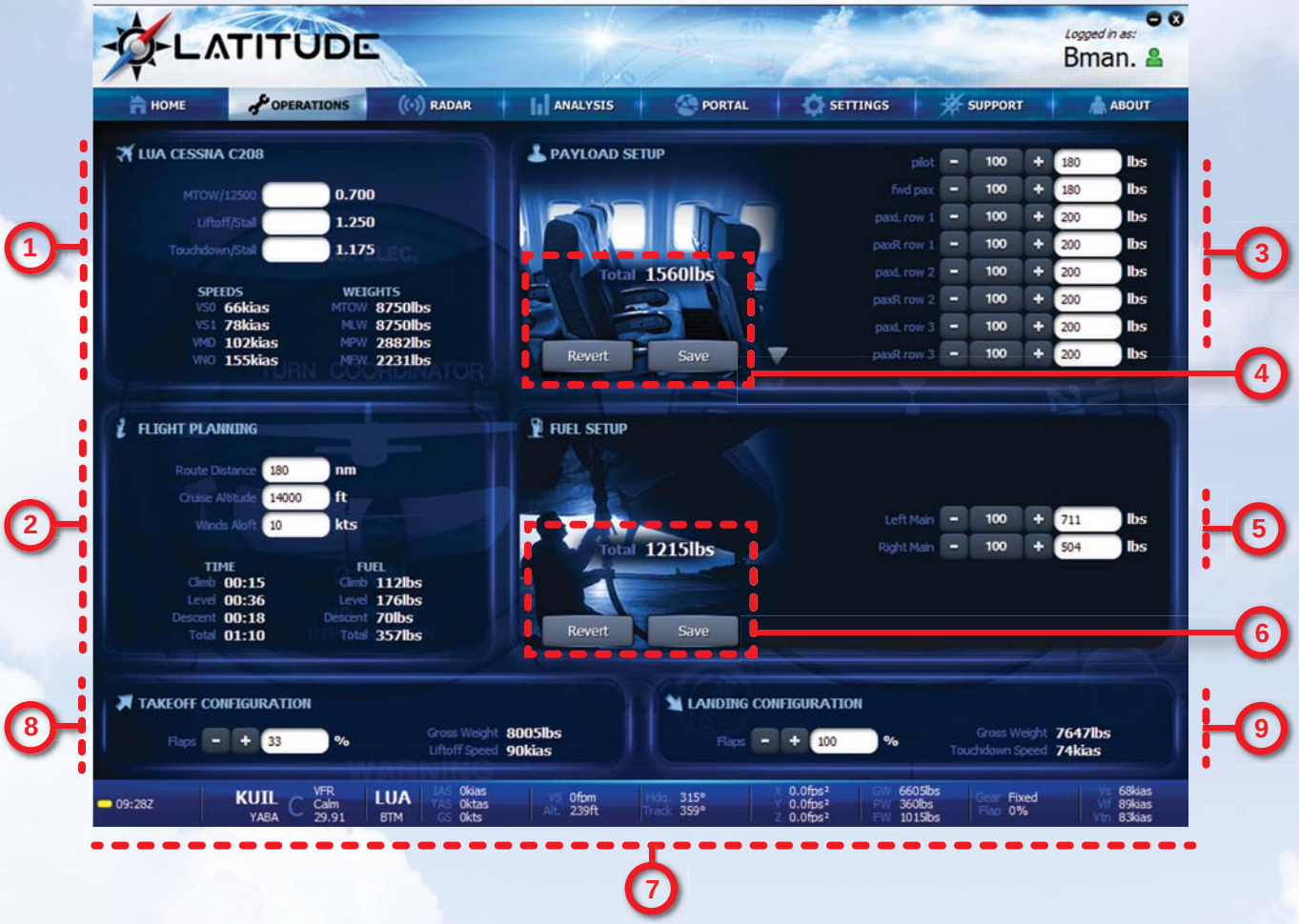



The **MTOW/12500** ratio determines how "big" an aircraft is. It tells Latitude whether to calculate stall speeds for the purpose of calculating liftoff and touchdown speed, based on GW or MTOW or somewhere in between. It also determines the default touchdown/stall ratio. Small aircraft don't care too much about their GW and land closer to their stall speed. This rarely needs adjustment and most aircraft fixes can be accomplished with the liftoff and touchdown ratios. **Note: Flight Management Systems (FMS) don't predict liftoff speed but rather V1, Vr and V2. Liftoff is anywhere between Vr and V2.**

## IMPORTANT NOTE

If you notice Latitude predicts liftoff or touchdown speeds differently than predicted by a Flight Management System (FMS), the Liftoff and Touchdown ratios can be changed directly in the liftoff/stall and touchdown/stall fields so the values within Latitude match the predicted speeds indicated by the FMS. Simply input different liftoff/stall or touchdown/stall ratios until the predicted values match the published real world values. In either case, you'll want to liftoff and touchdown at the speeds calculated by Latitude – either with or without modified MTOW/12500, liftoff/stall or touchdown/stall ratios.

**OPERATIONS** *(continued)*

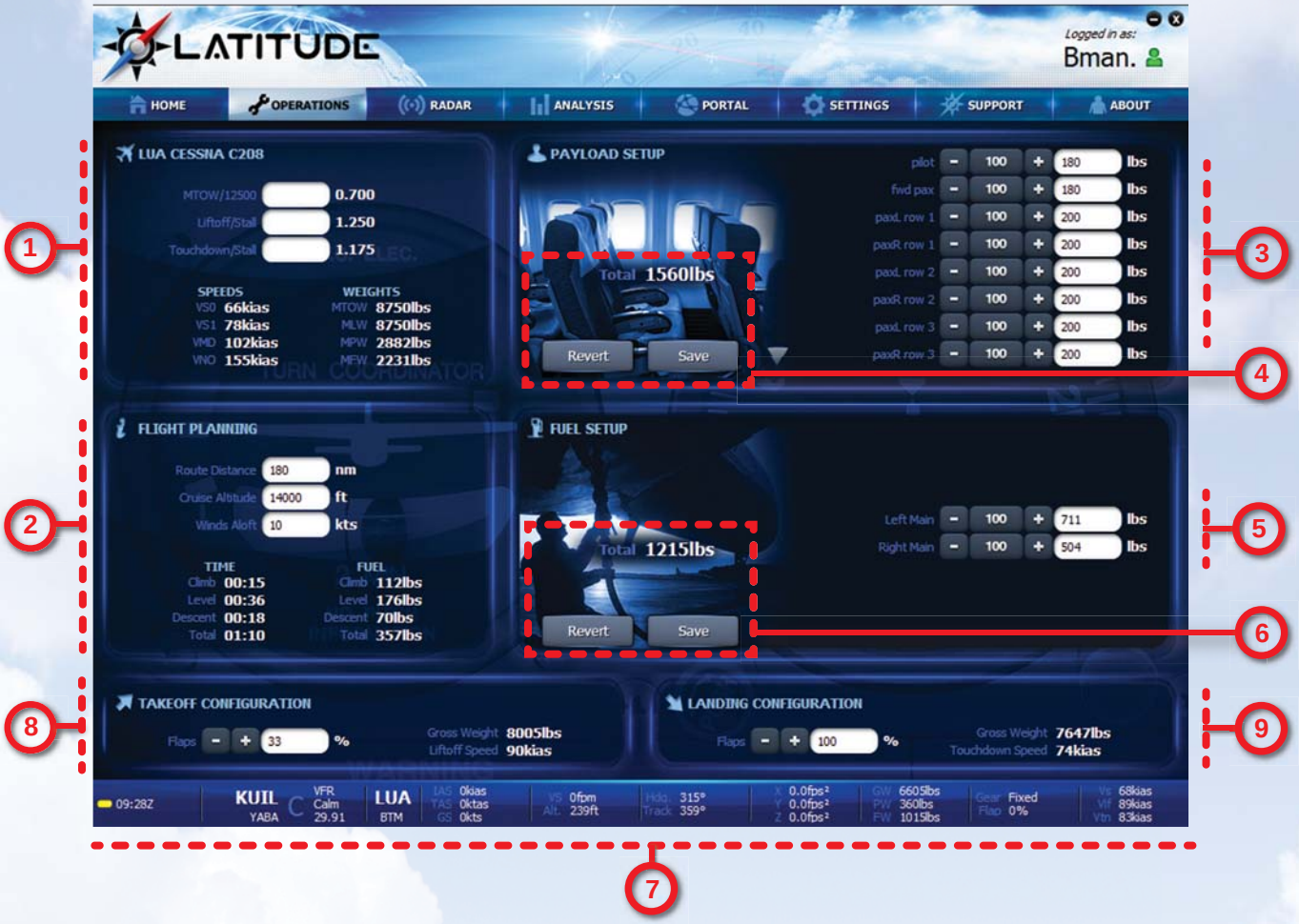



The **liftoff/stall** ratio is what's used to calculate the liftoff speed predictions. This speed should be between Vr and V2, if V2 is defined, otherwise 5-10 knots above Vr. Most aircraft become airborne at a speed approximately 25% above the stall speed (Vs0). This means the liftoff/stall speed is generally around 1.25 (or 125% of Vs0).

The **touchdown/stall** ratio used to calculate the touchdown stall is similar to liftoff/stall except that the default ratio is impacted by the MTOW/12500 ratio. What this means is that as an aircraft gross weight increases, the MTOW/12500 ratio comes closer to 1 which translates to a touchdown speed higher than the stall speed. Smaller and lighter aircraft will land closer to stall speed than larger or heavier aircraft.

Most of the aircraft tested have liftoff/stall and touchdown/stall values that are in agreement with Latitude calculations. There are the occasional aircraft where these values need to be adjusted. Adjust these values yourself to match POH or FMS values, or refer to the support forum for aircraft parameter ratios that fellow pilots have found to be more in alignment with the published values.

## OPERATIONS *(continued)*

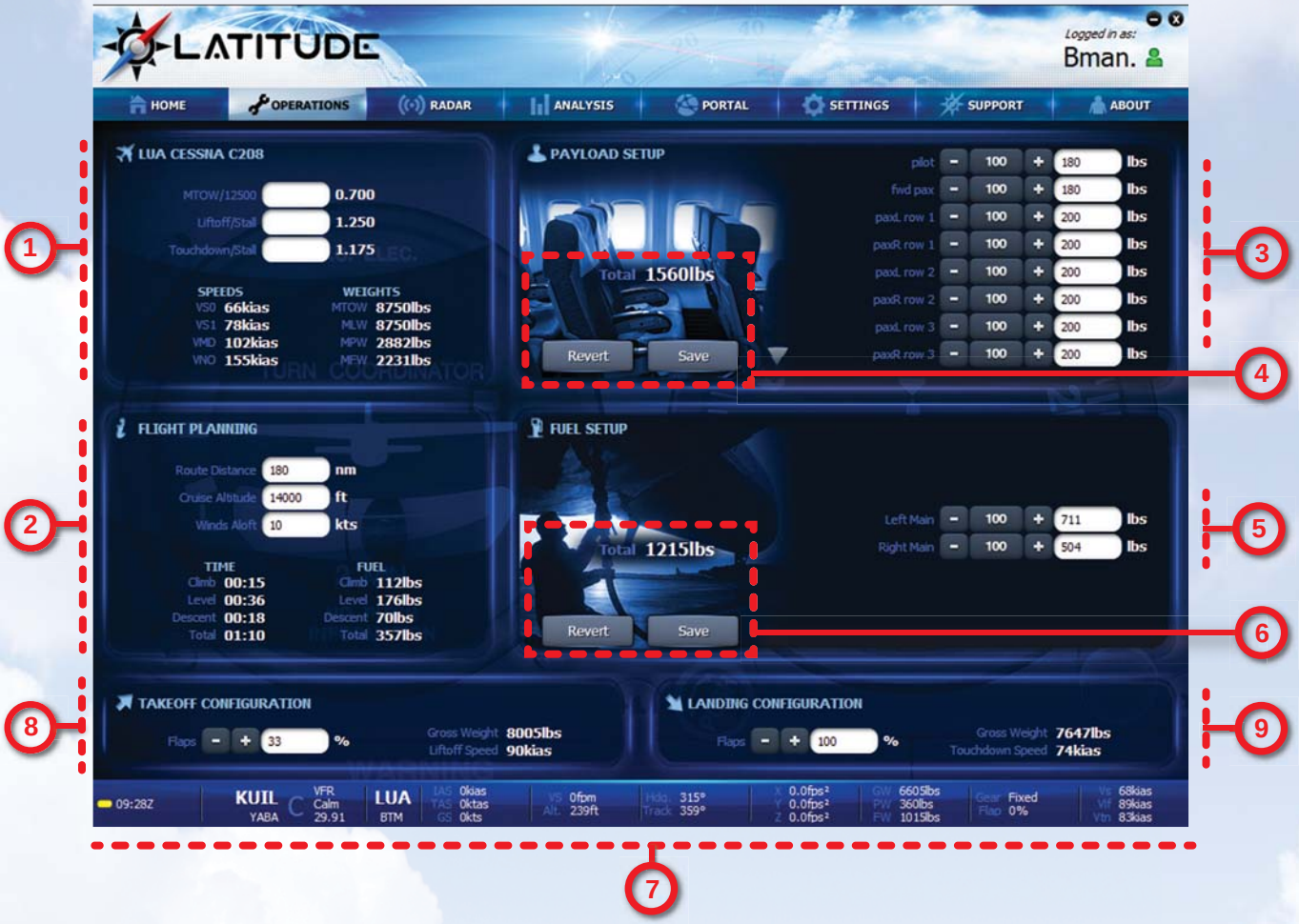



**2** **Flight Planning** – This area is a "rough" fuel planning calculator and should be used as a starting place for calculating the predicted fuel burn. This fuel planer does not take into account how a plane will actually be flown relative to cost indexes *(economy climb/cruise versus performance cruise climb)*. What this planner will take into account is the route distance, altitude and winds aloft relative to anticipated fuel burn as indicated by the aircraft model information. The planner gives you a generalized estimate of the fuel required *(without reserves)*. See Part IV: Career, Reputation and Economy Guide for additional information.

**Route Distance** – Include any expected deviations for weather events or anticipated approaches or alternates. If the distance entered is only point to point distance *(straight line from departure to arrival airport)*, the calculated fuel burn may be less than fuel actually used during the flight. **Since landing with 1.0 hour of reserves is critical to the earnings potential of a flight, fuel planning should be done accurately.**

**Altitude** – Expected cruise altitude should be input for more accurate fuel burn predictions.

**OPERATIONS** *(continued)*

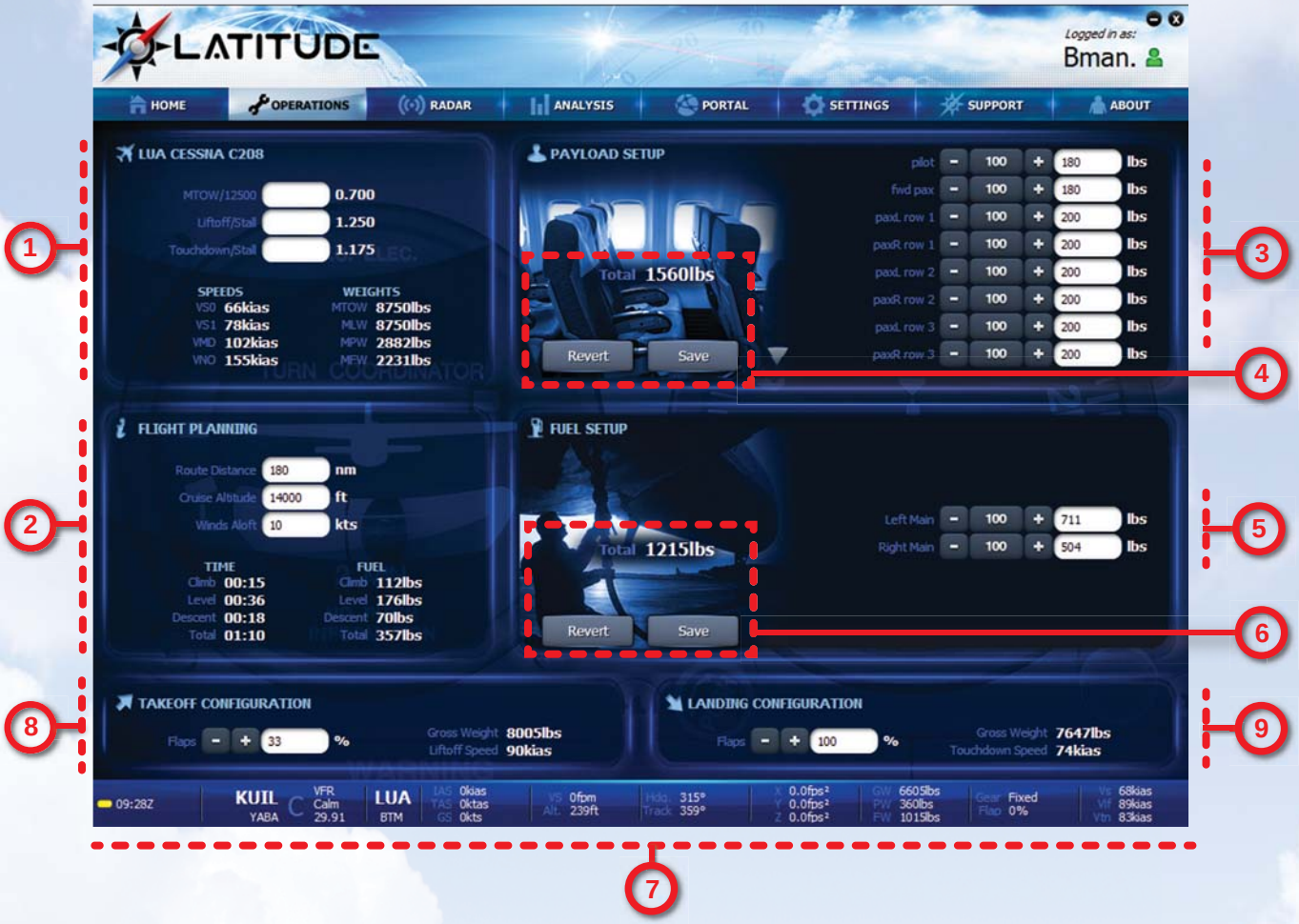



**Winds Aloft** – Winds aloft should be inputted for more accurate fuel burn predictions. Winds aloft play a significant role in estimating fuel burn. It's advised that you use your weather engine (REX Essentials PLUS, etc.) and input the ***average*** winds aloft during your flight. Headwinds & tailwinds have dramatic impacts on your total fuel usage so be accurate and err on the side of taking more fuel than needed.

**+ Values** = Headwinds
**- Values** = Tailwinds

Once the basic flight parameters have been input, Latitude will estimate your fuel burn during each segment of flight – Climb, Level, Descent and Total. Keep an eye on these numbers as they will be used to load the fuel into the aircraft. See items 6 and 7 for **Fuel Loading**.

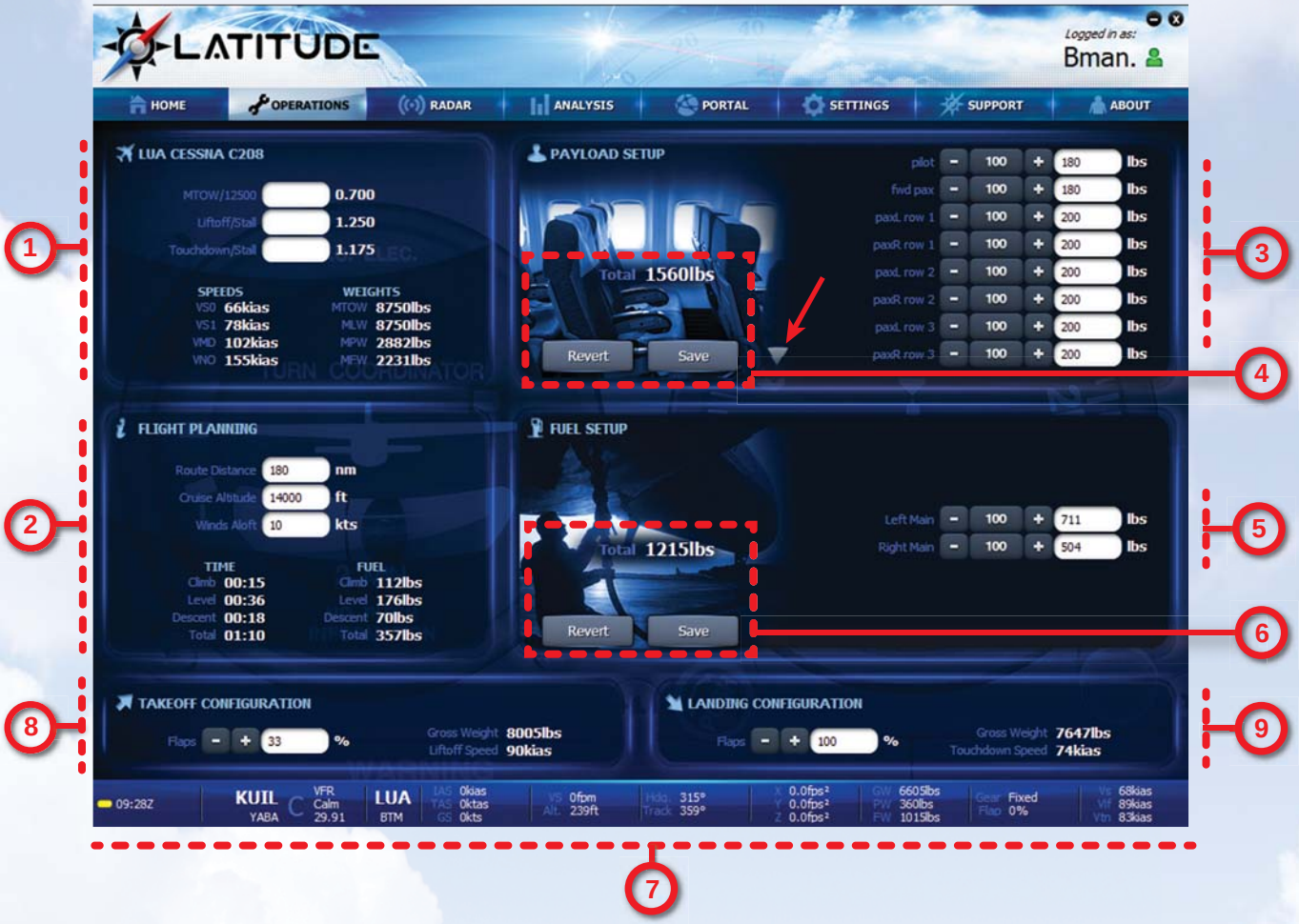
## OPERATIONS *(continued)*




**3** **Payload Setup** – This area can be used to load payload into FSX. It is not required to use this payload manager to load your FSX aircraft. ***However***, it's easy and quick to accomplish a payload configuration. It's important to keep in mind that the Latitude payload and fuel loading works in both directions with FSX. You can load Payload ***from*** Latitude and it will update FSX, and you can use FSX or a 3rd-party manager to load payload and this information will be fed back to Latitude.

What's important is that the payload is loaded *somewhere* and the values in FSX correlate to the payload value in Latitude.

**OPERATIONS** *(continued)*



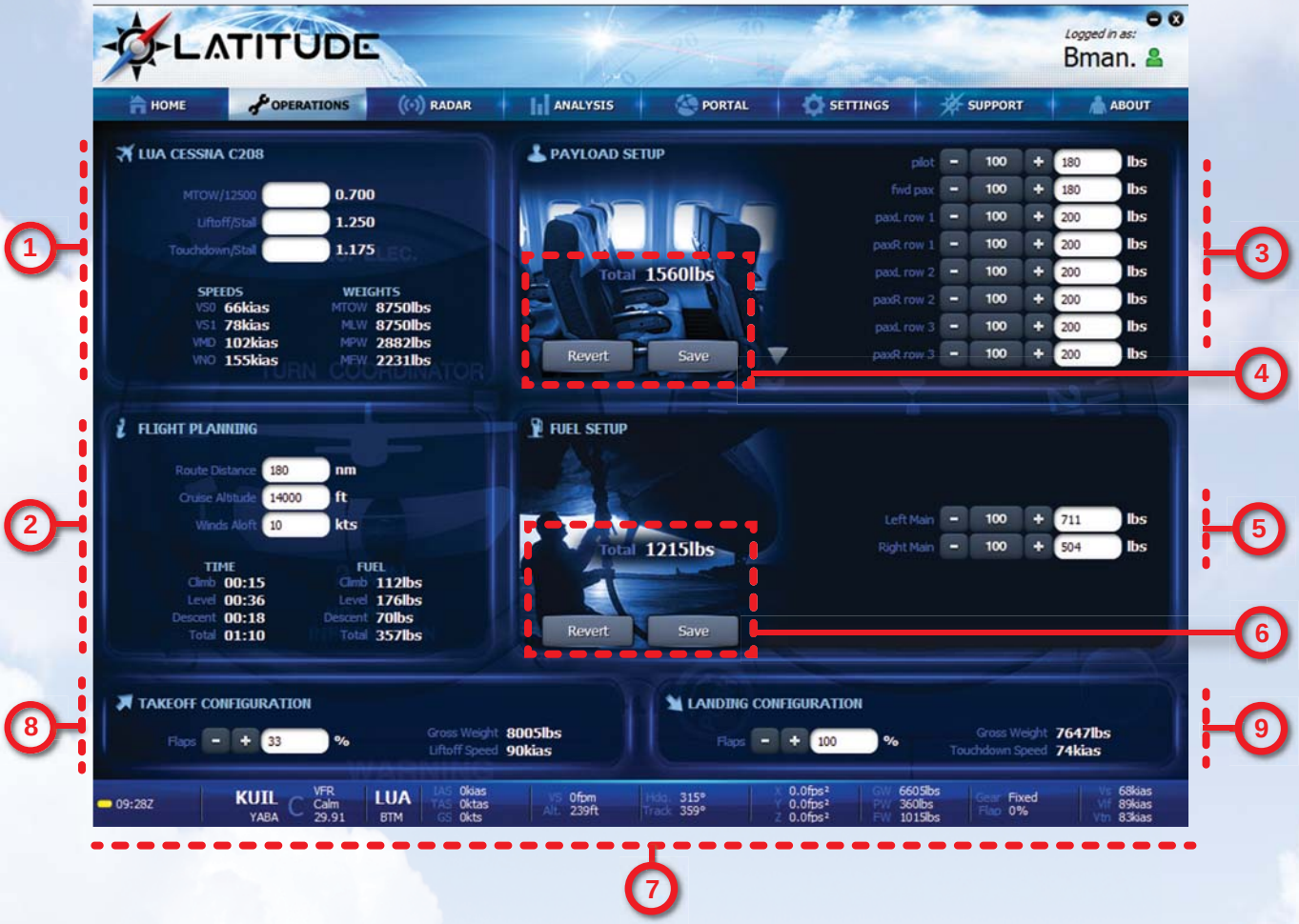

The payload stations depicted in the **Payload Setup** are directed by the aircraft model. Load the payload in a way to maintain some degree of rational center of gravity. There are no specific limits to where the payload is located on the plane. However, if you load all the weight at the front or back of the aircraft, prepare to have a difficult liftoff and touchdown. Note that some aircraft may have additional payload stations that are not indicated on the default payload station view. If there are additional stations, up/down arrows will be indicated on the left side of the visible stations (see arrow on payload setup image above). When clicked, the payload stations will scroll into view the additional stations.

## IMPORTANT NOTE

Once the weight has been input into the available payload stations, you must hit **SAVE** to load the payload into the FSX aircraft. If you don't click the **SAVE** button, the actual payload in FSX will not change.

While loading payload and fuel, do not exceed the MTOW, MPW, MLW values. You can view your current load configurations in the **Takeoff Configuration** & **SimConnect Information** panels and compare them to the maximum allowable weight shown in the aircraft parameters window. If you exceed the MTOW weight at takeoff, a significant financial penalty will be imposed to the flight uploaded to the **Portal**. When maximum landing weights (MLW) and maximum passenger weights (MPW) are exceeded, the overages will be deducted from the revenue generating payload as noted under the Earnings detail popup display.

**OPERATIONS** *(continued)*



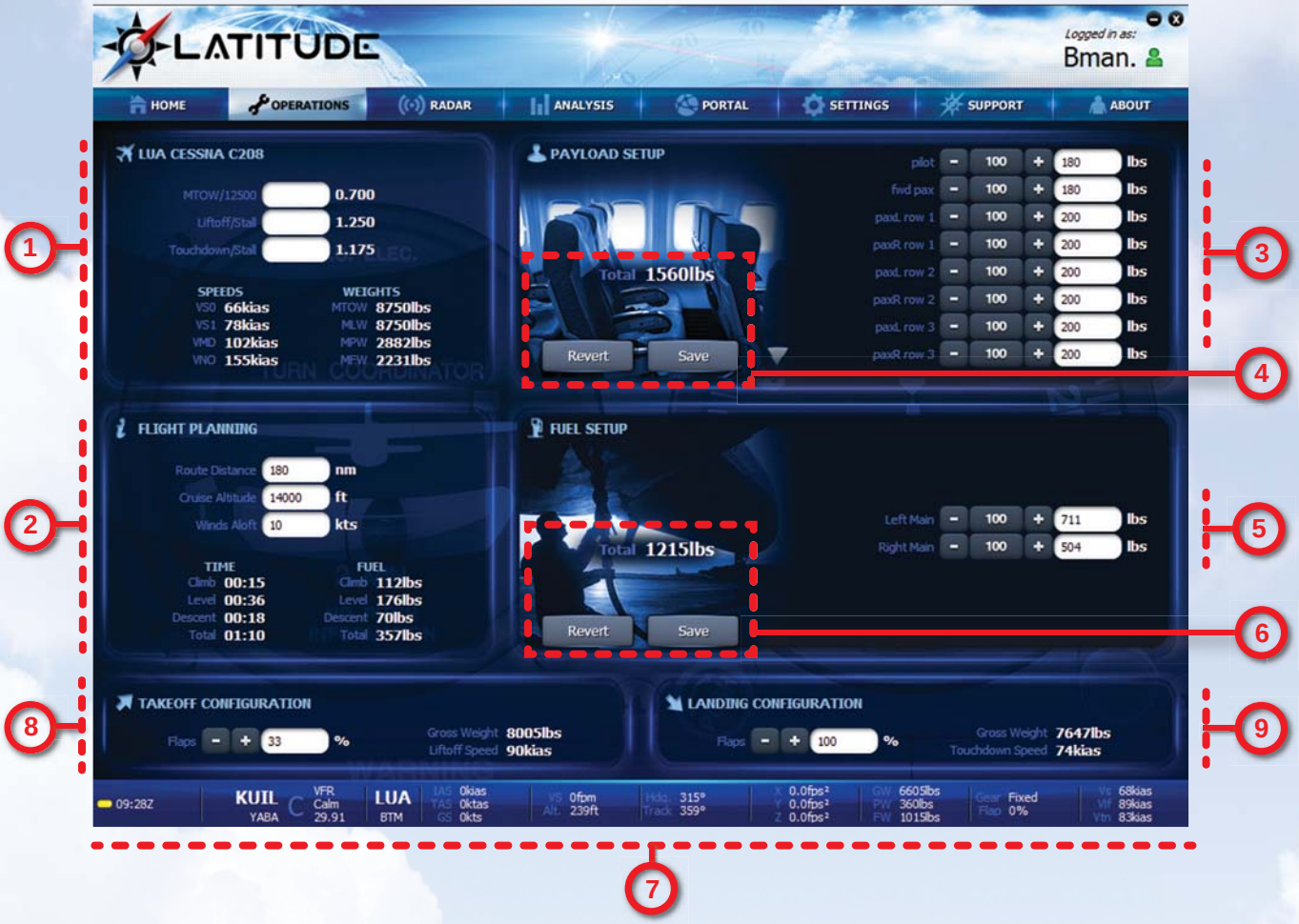

**4** **Save / Revert** – These buttons initiate the loading process into FSX. You can continue to manipulate values between Fuel and Payload setups until you find a good balance. Once **Save** is selected, the payload will be loaded into FSX and the aircraft statistics will be updated in the **SimConnect Information Panel**. If the **Save** button is not selected, the Payload values will not be changed within FSX. Pressing the **Revert** returns the Payload value to the previous load value prior to pressing save.

## IMPORTANT NOTE

Once Latitude has started recording your flight, no changes can be made to the **Payload Setup** area. If changes to payload occur during the flight, these changes will be announced by Latitude during the flight and payload changes will be deducted during flight analysis. With this in mind, the **Save** button will not be visible once flight recording has commenced.

**5** **Fuel Setup** – This area works under the same conditions as the **Payload Manager**. You may use Latitude, for convenience, or any other planner of your choosing. Again, Latitude pushes and receives data to/from FSX. If fuel is loaded here and the **Save** button is selected, the fuel is ALSO changed within FSX. If a 3rd-party manager is used, Latitude will automatically update the fuel load indicated assuming FSX has been updated.

## OPERATIONS *(continued)*

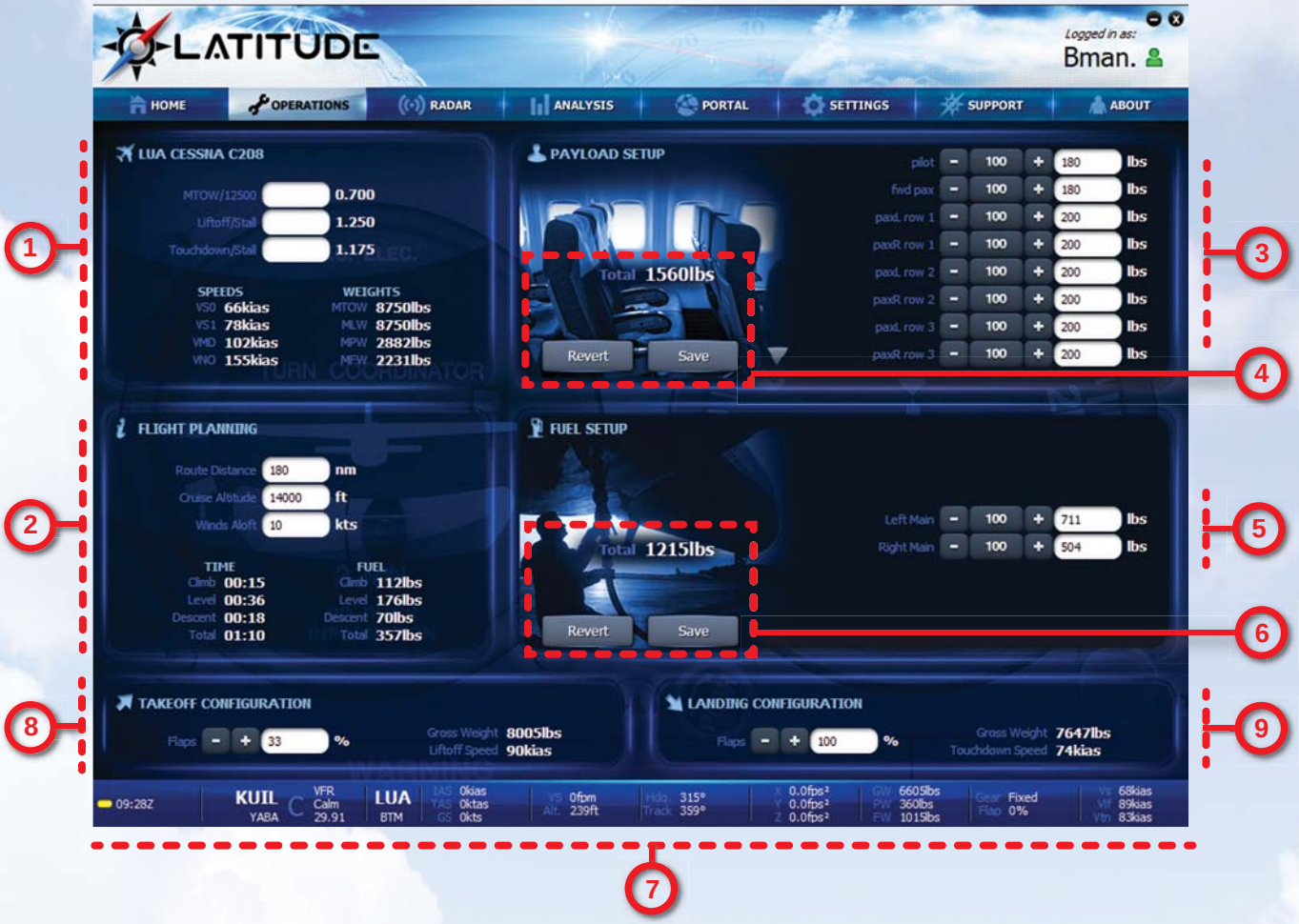



### IMPORTANT NOTE

Regardless of what the aircraft developer has implemented within a specific aircraft, Latitude and FSX will ALWAYS be in sync – not necessarily with the values a FMS, loadsheet or other instruments may display. If FSX 'sees' the aircraft loaded in a particular configuration, Latitude displays the SAME configuration. As with the Payload Setup, specific attention must be paid to the MTOW and MLW values when loading fuel. **Land with enough fuel reserves as well as carry enough payload weight to generate revenue!**

In more complex aircraft, the preferred method of loading fuel may be through an aircraft-specific fuel manager. This is completely acceptable. In some cases if you load the fuel via Latitude, the FMS may not reflect the correct fuel quantity so it would need to be adjusted again within the FMC to reflect the current fuel load. It ultimately depends on how the FMS is integrated within the FSX payload/fuel load management. At times, the values are simply references within the FMS itself, in other aircraft it may actually manipulate loaded quantities. This is an aircraft by aircraft basis. Take for example the PMDG BAe JS4100 – the loadsheet is a combination of both cases. You can add payload and fuel via Latitude and no updates will occur to the 'loadsheet' in the aircraft, but FSX fuel/payload values are updated. However, if you update the payload in the loadsheet in the JS41 Latitude will update as Latitude pulls the load information from FSX. The loadsheet itself can be modified with regards to payload, which will then update FSX and subsequently Latitude. The Fuel loading on the loadsheet does nothing in either case – it's simply a value to calculate the Trim Index figures. In this case, the most direct way to load the aircraft is to use the loadsheet for payload and fuel in Latitude. This assures that Latitude, FSX and the aircraft loadsheet are all in agreement.

**OPERATIONS** *(continued)*

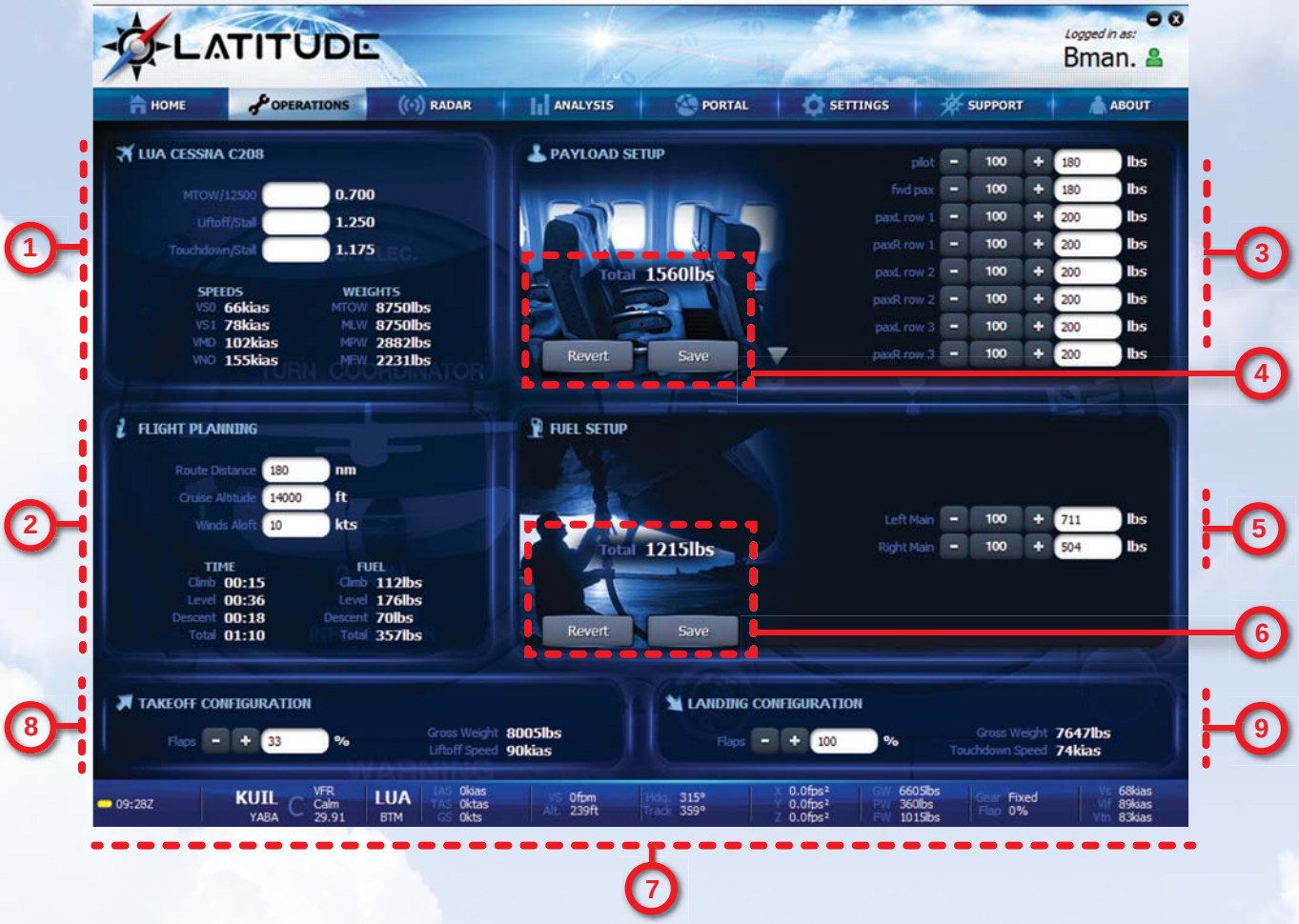



**6** **Save / Revert** – These buttons initiate the loading process into FSX. You can continue to manipulate values between Fuel and Payload setups until you find a good balance. Once **Save** is pressed, the fuel will be loaded and the aircraft statistics will be updated in the **SimConnect Information Panel**. If the **Save** button is not selected, the Fuel values will not be changed within FSX. Pressing the **Revert** returns the fuel value to the previous load value prior to pressing save.

## IMPORTANT NOTE

Once Latitude has started recording your flight, no changes can be made to the **Fuel Setup** area. If changes to fuel occur during the flight, these changes will be announced by Latitude during the flight and fuel changes will be deducted during flight analysis. With this in mind, the **Save** button will not be visible once flight recording has commenced.

## OPERATIONS *(continued)*

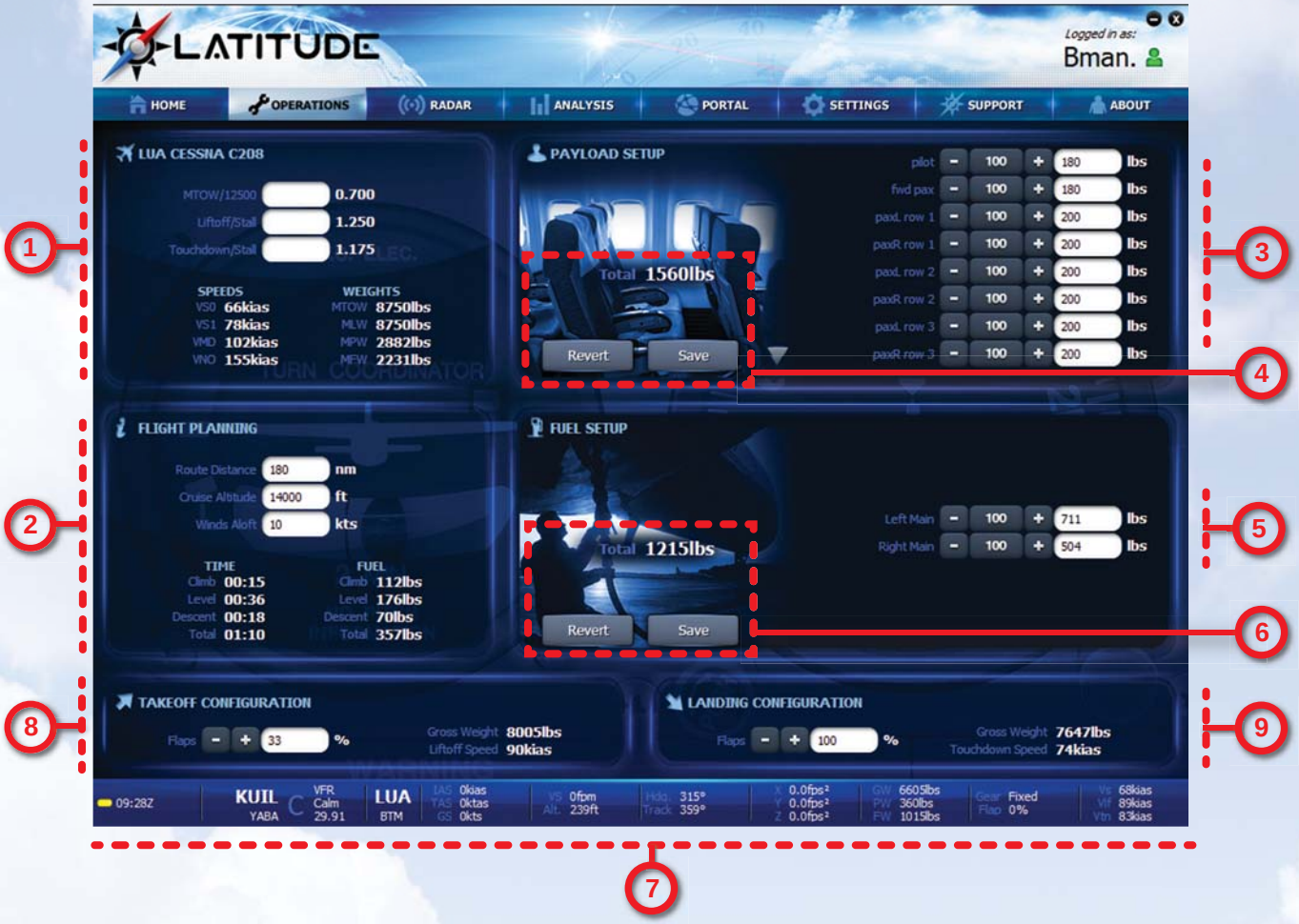



**7** **SimConnect Information Panel** – Displays the current FSX connection status, weather and aircraft statistics. This information is a real-time data feed via FSX/SimConnect. This information panel is shown on all Latitude pages. With regards to the **Operations** page, special attention should be paid to:

- Gross Weight, Passenger Weight, Fuel Weight values
- Gear & Flap Conditions
- Vs *(stall speed)*, Vlf *(liftoff speed)* and Vtn *(touchdown speed)*

This information should always be cross checked with your expected loading conditions *(as added by either Latitude fuel/payload manager or other payload manager)* prior to ground roll *(recording initiation)* to assure that what you have loaded through any payload manager matches what FSX 'sees' as the current aircraft configuration. Pay special attention to the **Gross Weight (GW), Passenger Weight (PW)** and **Fuel Weight (FW)** values as cross check them with maximum weights indicated in the aircraft parameters window. Taking off above **Maximum Takeoff Weight (MTOW)** or landing above **Maximum Landing Weight (MLW)** will impact your flight revenue.

## OPERATIONS *(continued)*



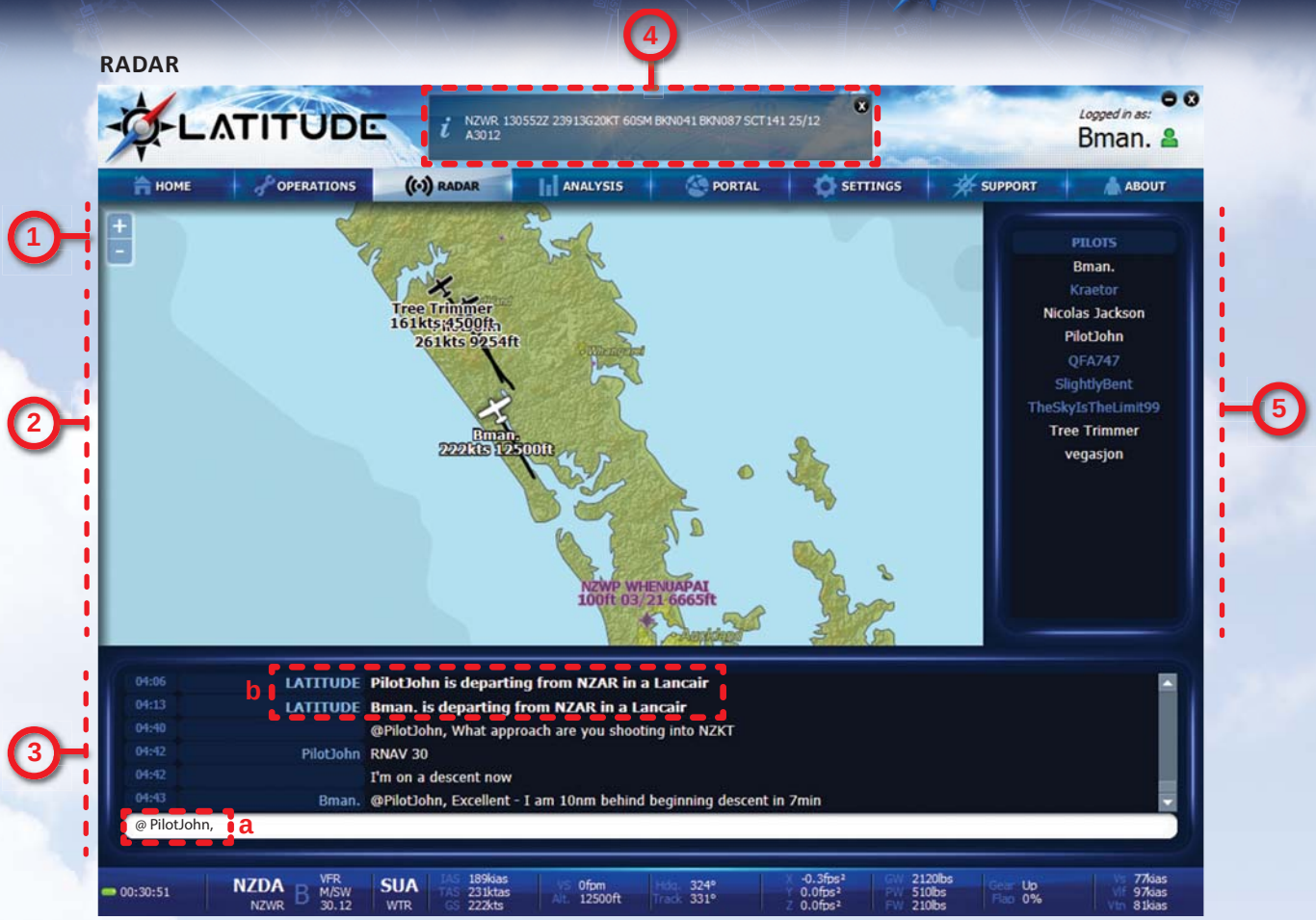

**8** **Takeoff Configuration** – Set flap conditions expected during takeoff. ***This does not actually set the flap within the aircraft***. Adjust the flap condition prior to takeoff roll to match your actual aircraft flap condition and Latitude will provide you with accurate expected liftoff speed predictions. The Gross Weight on the right side of this area shows expected GW at liftoff. Note: If fuel is adjusted in the Fuel Setup area but not "Saved", the gross weight will be inaccurate. Latitude will display the Gross Weight as indicated by FSX. However, if the fuel load is changed within Latitude, the Fuel Setup must be saved so the fuel is changed *within* FSX. Verify that all payload and fuel conditions are saved and cross checked, then verify the gross weight of your current configuration.

**Liftoff Speed** displayed below Gross Weight is the expected liftoff speed based on gross weight and flap configuration. **The current value will be announced by Latitude once recording has initiated during takeoff roll.**

**9** **Landing Configuration** – Set flap conditions expected for touchdown. ***This does not actually set the flap within the aircraft***. Adjust this flap condition during approach to match the aircraft actual flap condition and Latitude will provide you with accurate expected touchdown speed predictions. The Gross Weight on the right side of this area displays expected GW at touchdown.

**Touchdown Speed** displayed below Gross Weight is the expected touchdown speed based on gross weight and flap configuration. **The current value will be announced by Latitude once the approach phase has initiated.**

## RADAR




The **Radar** area is where you can interact with all pilots currently logged into the **Portal**. Pilots who are not flying but logged into the **Portal** will not be displayed on the Pilots list or the map but can still chat with other that are logged in. You need to be logged in to the Portal to chat with others.

**1** **Zoom In / Zoom Out** – Increases / Decreases the map zoom level.

**2** **Map** – The primary map displays all pilots currently logged into the portal with an active flight. Hovering over pilot aircraft will indicate pilot's plane type, speed and altitude. Zooming up on an airport symbol will indicate the airports runway type and lengths.

**3** **Chat Window** – Here you can have a conversation with all other pilots currently logged into the **Portal**. Simply type in the white field at the bottom of the chat window and press 'enter'. If you want to send a highlighted message to a fellow pilot on the portal, click their name on the left side of the chat window or type @ followed by the pilot's name (See 'a'). This also makes it very convenient to respond to a message directly. The chat window will automatically announce departures and arrivals of other pilots. (See 'b')

**4** **Information Window** - This information window will display various notifications. In the Radar window, if you click anywhere on the weather information indicated on the SimConnect information panel, the current METAR information will be displayed in this information window.

**5** **Pilots** – This is a list of the current pilots logged into the **Portal**. Pilots listed are color coded to indicate ***chat only*** *(blue)*, ***observing*** *(light blue)* or ***recording*** *(white)*. Clicking on a pilot's name that is currently active in the simulator (light blue or white) will center the map on the pilot's current location. Subsequent clicks on the pilot's name will zoom in on the pilot's location.

## ANALYSIS

The **Analysis** section is where you may review your flight scores as well as review a myriad of other statistical data pertaining to your flights. The **Analysis** page contains two primary tabs – **Scores** and **Charts**. Become familiar with all the information provided on this page and you will find a host of factors that you likely never considered during simulated flights prior to Latitude. There's an enormous amount of information to digest on this page, however, with practice in conjunction with the **Part III: Scoring & Flying Guide,** you'll begin to get an understanding of how your flight was conducted and what you can do to improve your pilotage.

### IMPORTANT NOTE

Fields that are underlined have additional information contained in a pop-up window when clicked on. Click the pop-up again and the screen will revert to the default overview. Reviewing the pop-up information is a great way to understand where scores incurred deductions and what to improve on your next flight.

## ANALYSIS: SCORES

**1** **Scores** – This tab displays overall flight scores, overall phase scores and metric deductions.

**2** **Flight Select** – The flight indicated in this field is the flight that's currently being displayed and scored. All flights conducted and recorded with Latitude will appear in the pull-down list. You can recall previously recorded flights at any time to review the scores and suggestions. The colored dot indicator on the left side of the selected flight field is a status indicator of the flight upload status to the **Portal**.

**Red** The flight has been flagged to never upload to the **Portal** or there was an error uploading the flight. Hover over the flight to view messages regarding the upload success or error.

**Yellow** The flight has been completed and not yet uploaded to the **Portal**. During the next upload initiation, all flights indicated with yellow will be uploaded.

**Green** The flight has been uploaded to the **Portal**. Once the flight is uploaded, it's permanent!

Flights that are incomplete *(not containing a takeoff, enroute, approach and landing phases)* will automatically be marked 'red' as these flights cannot be uploaded to the **Portal**. Whatever phases completed during a flight will be scored and can be analyzed but not uploaded to the **Portal**.

**3** **Scoring Criteria** – Determines the scoring criteria used for the selected flight. The scoring criteria can be changed to any desired level at any time during the review of a flight. However, all flights uploaded to the **Portal** will be scored according to your Portal Career Level. Refer to **Part IV: Career, Reputation & Economy Guide** for career ranking criteria. As previously discussed, the scoring criterion varies in leniency and becomes less forgiving at higher certificate levels.

**4** **Portal Upload / Reject** – These two buttons are used to either upload your flights, flag them to not be uploaded or delete them permanently from your system. You must make a decision to upload a flight or flag the flight to *never* be uploaded to the **Portal**. Pressing the Upload button (double arrow icon) will upload all flights to the **Portal** unless they are flagged to not upload ('no' icon). If a flight is flagged to not be uploaded *(red status indicator left of the flight selected)*, this can be changed in the future to upload status. However, if a flight has been uploaded ***after*** the marked flight, the **Portal** will reject the marked flight as it would drastically alter your **Portal** landscape. Pressing the "upload" button will send all *full/complete* flights to the **Portal** that have not been previously uploaded. At that time the flights will be scored according to your Career Level scoring criteria, earnings tabulated and reputation adjusted. The flights will remain in both the **Analysis** page as well as the **Portal** page regardless of the upload 'flag' status. For deep analytical view of flights, use the **Analysis** page as it will provide tips and scoring deduction comments. If you wish to permanently delete a flight, hold the 'do not upload' button continuously for 5 seconds. This will remove the flight from your local database. However, once a flight has been uploaded to the Portal, it cannot be removed from the Portal.

**5** **Search Bar** – The search bar can be used to filter your completed flights for recall. For example, if you wanted to see only your flights in a Cessna 182, type in Cessna or 182 and the filters will be applied to the Flight Select list. Clear the filter list to restore all your logged flights within Latitude.

**ANALYSIS: SCORES** *(continued)*

**6** **Flight Comments** – This upper section is a snapshot view of the scoring metrics that caused scoring deductions. The comments adjacent to each metric will tell you why deductions were incurred. Clicking the Details text at the end of the comment will display a pop-up window with additional numerical data relating to the deduction.

Comments are listed for both **Skill** and **Comfort** deductions. **Skill** deductions are highlighted with a green hue and an orange hue for **Comfort** deductions. The degree of deduction is indicated numerically and color coded for quick recognition of problem areas. The highlighted comment colors correlate to the same colors shown in the scoring metric fields. The degree of scoring deductions are color coded by the following scale:

**Scoring Deductions:**

| | |
|---|---|
| 0% ~ 12.5% | = No Comment |
| 12.5% ~ 25% | = Fair (green) |
| 25% ~ 50% | = Marginal (yellow) |
| >50% | = Poor (red) |

Depending on what scoring criteria you have selected, it will increase/decrease the number of comments you will receive as feedback to your flight. Remember, under Student scoring criteria, the observer is more lenient and you may not have as many Marginal or Poor deductions as you would if the scoring criterion was based on Airline Pilot judging criteria.

**7** **Total Score** – Indicates the selected flights total flight score. The total score is not an average of each phase of flight but rather a "perceptual" based score where higher degree of deductions have higher impacts on the total score. The green scores indicate **Skill** and the orange scores indicate **Comfort**.

The **Limits** deductions on the left and right of the scores are deductions imposed directly to the overall scores. The limits measured includes:

- Speeds over Vdf *(Demonstrated Flight Diving Speed)*
- Auto coordination *(setting under FSX realism tab)*

If **N/A** is displayed in the total score field, the flight did not record the four required distinct flight phases. Only the phases recorded will be scored on an individual phase basis. It's OK if you wish to practice approach after approach, as you can analyze just the approach score. These approach-only flights cannot be uploaded to the **Portal** nor will they contain a comprehensive total score.

**ANALYSIS: SCORES** *(continued)*

**8** **Phase Scoring** – Indicates the individual phase scores and deductions incurred during each phase based on the metrics observed. The four phases include Takeoff, Enroute, Approach and Landing. All scores range from 0% ~ 100%. All scores start at 100% and as deductions are applied, the score will decrease to a minimum of 0%. Each scoring metric under the phases can be clicked to show a pop-up displaying the relative impact of that metric to the phase score. Clicking the ***deduction value*** will display a pop-up window with additional information showing your deviation values and the associated deductions. Some deductions may include multiple deductions to comprise the total deduction for the metric. A great example of this is the Vertical deductions under the Enroute phase.

**9** **General Flight Information** – Lists the specifics or your flight. Aircraft make, model, weather conditions during departure and arrival, total distance flown and average speed over the entire route. Clicking on any of the fields will show a pop-up window displaying specific information as listed below:

Clicking the Aircraft field will display Maximum Takeoff Weight (MTOW), Operating Weight (OEW), Maximum Passenger Weight (MPW) and Maximum Fuel Weight (MFW).

Clicking the Conditions field will display the raw METAR observations

**10** **Takeoff Events** – Displays statistics of your Takeoff at specific intervals including aircraft configuration when flight recording began, ground roll time / distance and vertical climb time, altitude and distance at 35', 50 and 400' Height Above Liftoff (HAL)

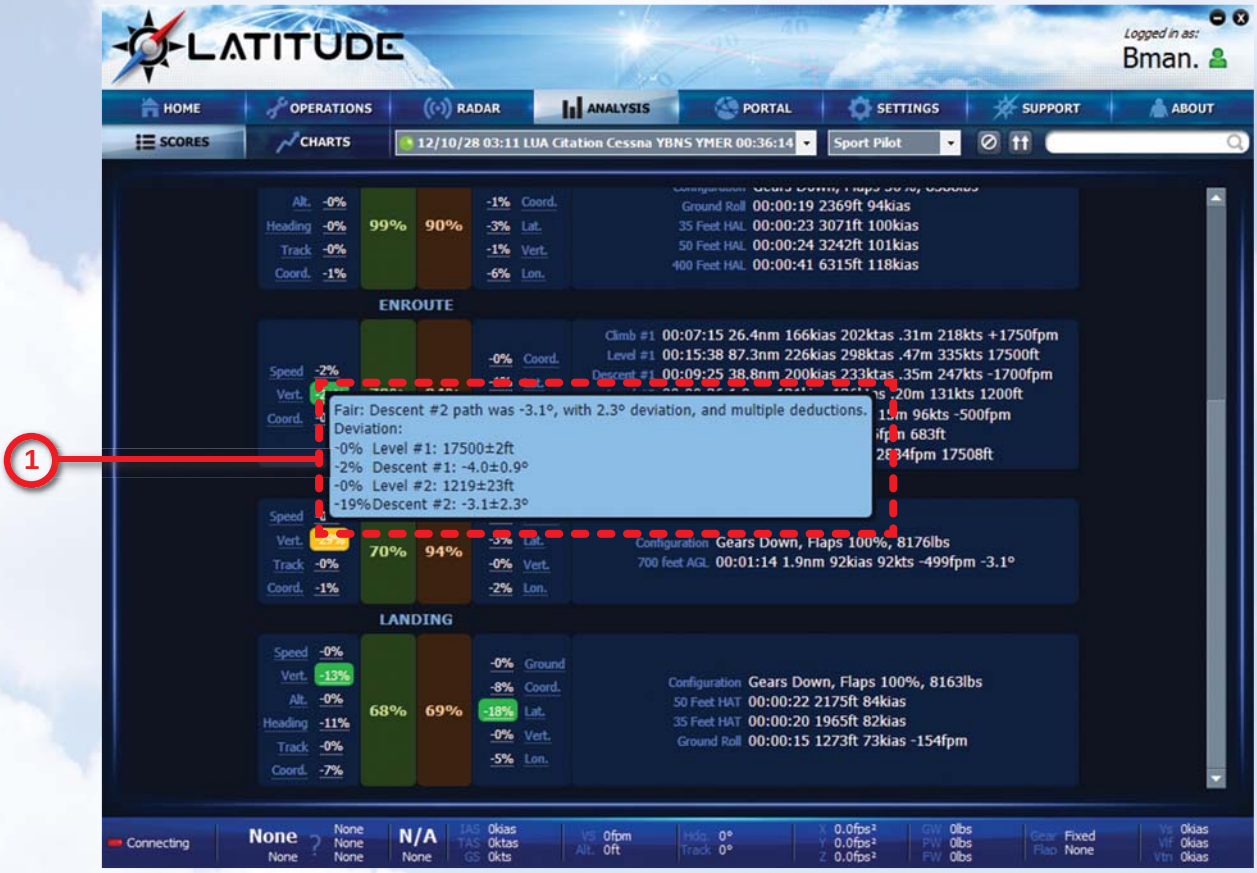
**11** **Enroute Events** – Displays the climb, level and descent segments that occurred during the enroute phase of the flight. Since each segment *(climb, level, descent)* is analyzed individually, each segment is listed with the time/distance duration, average speeds during the segment and average vertical speed. It's important to note that while reviewing the individual segments, you want them to be as long as possible and deliberate. This is important because very short segments *(15 second minimum)* will not have enough duration to produce a lower deviation from average. If the segment is 10 minutes long then non-intentional movements up or down can be mitigated by a long smooth path within the same segment thus a better deviation *average*. Any segments that is less than 15 seconds will be combined with the trending climb or descent flight path. This means that Latitude understands that a semi-level or very short segment was not intentional and the deviation from the climb/level/descent path will be pretty large.

For additional information pertaining to the climb/level/descent segments, click on the vertical deduction value on the scoring column to view each individual segment breakdown including deviation values and associated deduction value imposed to the enroute phase.

**12** **Approach Events** – Displays the approach configuration at the time *Approach Phase* has initiated. This data includes the time/distance from approach trigger altitude (varies by aircraft weight to 50' HAT) the average approach speed, average vertical speed and flight path average angle. Clicking on the popup information in the scoring columns will display deviation values associated with scoring metrics of the approach phase.

**13** **Landing Events** – Displays similar information to the takeoff data. The aircraft's flap/gear configuration at 50' HAT and the time/distance/speed from 50' and 35' HAT and lastly the ground roll time, distance and touchdown vertical speed.

## ANALYSIS: SCORES: DEDUCTION POP-UP




**1** **Deduction Pop-ups** – Clicking on any deduction value *(underlined values next to scoring metrics)* will display a pop-up with additional information about the metric analyzed and the deductions imposed. Each type of category analyzed will provide difference information. From the same flight used in analysis example, the comments at the top of the page indicated there was a "Fair" deduction associated with the vertical profile. Clicking on the vertical value the pop-up displays the two level and two descent segments that occurred during the enroute phase. The segments are also displayed in the **Enroute Events** on the right. Clicking on the vertical pop-up shows you why deductions were imposed. Notice in the example above, the level segments resulted in no deductions. The level segment was just that, level. The Descent segments, particularly descent #2 has a larger deviation from the flight path of +/- 2.3° variance over the average path of -3.1°. This deviation resulted in a 19% enroute phase deduction. Combined with the other descent, the total vertical profile during the enroute phases resulted in a 21% deduction.

Where is the Climb segment indicated in this pop-up of the enroute phase you might ask? The Climb segment is not listed under the vertical profile as climbs are scored based on constant speeds – not consistent vertical speed or flight path angle. The deductions associated with the climb segment can be found by clicking on the "Speed" metric.

### ANALYSIS: SCORES: DEDUCTION POP-UP

Metric deduction pop-ups will list flight data in the following formats:

**Takeoff**

- Late/early liftoff: Liftoff was Z fast/slow. Liftoff occurred at X knots, but Y was expected.
- Hop/sink: X of the time after leaving the ground spent hopping/sinking. Y seconds were spent ascending after initial liftoff.
- Crosswind error: Ground track at liftoff was X, but the aircraft heading was Y. Heading was Z left/right of track.
- Weaving: Ground track and track after liftoff was X, but wavered left/right Y degrees. Z% is a factor of ground surface change. This value is reduced when surface changes occur relative to speed at which surface change offered.
- Rudder coordination: Slip/skid ball deflection was X% during the takeoff. Slip/skid ball deflection wavered left/right Y%.

**En Route**

- Speed management: Lists deductions associated with deviations from constant speed.
- Vertical profile: Lists deductions associated with deviation from constant path.
- Coordination: Lists slip/skid ball deflection was X% during the enroute. Slip/skid ball deflection wavered left/right Y%.

**Approach**

- Speed: Lists deductions associated with deviations from constant speed.
- Vertical profile: Approach slope was X (+/-FPM), but wavered up/down Y (+/-FPM). Approach was Z (FPM) shallower than descent to landing. This multiplier degree is trimmed at 1° and is relative to the landing phase vertical speed average from 50' / approach average vertical speed. If the value is greater than 1, the approach was shallow and a multiplier great than 1 will be used.
- Track and turning: Approach was straight (X) followed by curve (Y). Straight ground track was X, but wavered Y. This can be opposite where Curved turn (X) rate was X, but wavered Y.
- Coordination: Slip/skid ball deflection was X% during the approach. Slip/skid ball deflection wavered left/right Y%.

**Landing**

- Late/early touchdown: Touchdown occurred at X knots, but Y was expected. Touchdown was Z fast/slow.
- Vertical rate: Touchdown was X, with average of Y from 50 HAT. Excessive average rate of Z from 50 HAT.
- Float/Bounce: X of Y seconds were spent ascending before finally settling on ground from 50 feet HAT.
- Crosswind error: Ground track at touchdown was X, but the aircraft heading was Y. Heading was Z left/right of track.
- Weaving track: Ground track and track after touchdown was X, but wavered left/right Y degrees. Runway surface changed during ground roll.
- Coordination: Slip/skid ball deflection was X% during the takeoff. Slip/skid ball deflection wavered left/right Y%.

**Comfort**

- Ground: x% of the ground roll was bumpy.
- X: Lateral acceleration force was X fpm+/- rate.
- Y : Vertical acceleration force was Y fpm +/- rate.
- Z : Longitudinal acceleration force was Z fpm +/- rate.
- Coordination: Slip/skid ball deflection was X% during the takeoff. Slip/skid ball deflection wavered left/right Y%.

## ANALYSIS: CHARTS

The **Charts** section *(sub page to the **Analysis** section)* is a graphical representation of your recorded flight data both in profile view and plan view. The chart paths are plotted in 1 second intervals for performance considerations. Reviewing the information on this page will help you graphically understand where score deduction events occurred. The chart will display all recorded flight phases and any deviations or abnormalities that occurred during flight phases. Hover the mouse over any line depicted in the profile chart and additional aircraft information about that given point will pop-up.

**1** **Flight Time Scale** – Displays the flight time progression of a flight. From the example above, you can see the level segment occurred around the 8 minute mark *(8 minutes into the flight)*. Hover the mouse cursor over the timeline and roll the mouse scroll wheel to change the time scale. When the time scale is adjusted the Distance Traveled Scale will adjust accordingly.

**2** **Altitude Scale** – Displays the altitude above sea level (ASL). Hover the mouse cursor over the altitude and roll the mouse scroll wheel to change the altitude scale.

**3** **Altitude + VS** – This is the Altitude and Vertical Speed (VS) zoom area. Rolling the mouse scroll wheel at this location will change the scale. You can also click and drag the Altitude + VS scale up/down to relocate the plotted lines. The Altitude + VS lines are indicated on the vertical profile chart as the green lines. The heavy green line indicates your Altitude Above Sea Level (ASL). The thin green line indicates your vertical speed.

## ANALYSIS: CHARTS *(continued)*

**4** **Distance Traveled Scale** – Represents the nautical miles traveled during a flight. From the example above, you can see that level off occurred around the 33 nautical mile mark. Hover the mouse cursor over the nautical miles bar and roll the mouse scroll wheel to change the scale. When the distance traveled scale is adjusted the time scale will adjust accordingly.

**5** **Transition Indicators** – The dots indicate phase and segment transitions. Hover over these dots to see what phase or segment changes they represent. Note: Some dots may be very close to one another – for example end of climb and beginning of level will be right next to each other.

**6** **Chart Zoom** – The scale of the entire profile chart can be scaled by rolling the mouse scroll wheel in the primary window. All scale bars will adjust accordingly. You may also click and drag the primary chart in individual axes (to the left/right/up/down of the main chart area).

**7** **Terrain Elevation** – The light blue line indicates the terrain elevation.

## IMPORTANT NOTE

Hovering over any of the lines depicted on the charts will display actual values at that location. When zoomed in, axes can be zoomed or moved individually.

## ANALYSIS: CHARTS *(continued)*

**8** **Plan View Chart** – This chart is a plan view *(top down view)* of the route. Blue dots on this chart represent phase changes that occurred during the flight and the departure and arrival airfields. The numbers on the left and bottom of the chart are the latitude/longitude locations of the flight path. Hover the mouse over any part of the flight path and the lat/long/time will be displayed. Rolling the mouse wheel will zoom in/out on the current cursor location. Zooming in on the airport will indicate the airport location and runway configuration. The plan view can be toggled on / off in the settings page.

**9** **Speed Type** – The orange lines represent three speed indicators during the flight.

**Light Orange**: Ground Speed (GS) - True Airspeed + Wind Speed
**Medium Orange**: True Airspeed (KTAS) – Static air pressure and calibrated airspeed (CAS)
**Heavy Orange**: Indicated Airspeed (KIAS) – Measured from pitot-static pressure gauge

**10** **Speed Scale Bar** – Represents the speed of the aircraft relative to Ground Speed (GS), True Airspeed (KTAS) or Indicated Airspeed (KIAS). Each speed measurement type is transposed on the absolute value indicated on the scale bar. Scroll the mouse wheel over the Speed Scale Bar will adjust the scale and Speed Type indicator will adjust accordingly. You may also click and drag the vertical placement of the plotted speed graphs.

## PORTAL

The **Portal** is where you access all of Latitude's features beyond a complex analytical view of flights. The **Portal** is where pilot's flights build a career, gain reputation and earn revenue within the multiplayer environment. As noted within the **Analysis** page description, to participate in any of the online environment content *(careers, reputation and economy)* you're only required to do the following:

1) Complete flights that include all flight phases - takeoff, enroute, approach and landing
2) Uploaded flight to the **Portal** using the upload buttons on the **Analysis** page

If either of these tasks are not complete, there will not be career, reputation or economic components to your simming environment – just the analytical scoring. There is no requirement to participate in the Latitude online environment, however, **it's a fun and exciting way to experience aviation aspects found in real world**. If you choose not to upload your completed flights to the **Portal**, you can still have a objective analysis of your flight. It's at the pilot's discretion to determine which completed flights are uploaded to the **Portal**. However, the less flights you upload, the slower your growth will be within the multiplayer career, reputation and economy ranks.

The **Portal** section has three sub-charts – *World, Pilots* and *Flights*. Refer to **Part IV: Career, Reputation & Economy Guide** for specific information relating how the Latitude's Career, Economy and Reputation systems operate within the **Portal**.

The **Portal** may be accessed at any time at www.rexlatitude.com. The content that is displayed within the **Portal** tab is identical to the content you see on the Latitude website. The **Portal** tab and the webpage are synonymous with one another.***When you're away from your simming machine, you can still catch up with the day's action by visiting the website.***

## PORTAL: WORLD

The **World** page displays both the current **Pilot Leader Boards** and **Flight Leader Boards**.

**1** **World** – This page displays the current leader boards.

**2** **Pilot Leader Boards** – This area identifies the top pilots leading in Career Skill score by Career Level.

**3** **Career Level** – This header distinguishes the top ranking pilots by career level. Scrolling through the page will list the top pilots for each career level. For a more detailed look at a specific leader, left click the pilot's name to see the flights that put them on the leader board.

## PORTAL: WORLD

The **World** page displays both the current **Pilot Leader Boards** and **Flight Leader Boards**.

**1** **World** – This page displays the current leader boards.

**2** **Flight Leader Boards** – This area identifies the top flights leading in Overall Skill score by Career Level.

**3** **Career Level** – This header distinguishes the top ranking flights by career level. Scrolling through the page will list the top flights for each career level. For a more detailed look at a specific flight, left click the flight number to see the details that put the flight on the leader board.

## PORTAL: PILOTS TABLE

The **Pilots Table** is a tabulated list of all pilots that have logged flights to the **Portal**. From this section you can sort the table columns to see where you rank amongst your fellow pilots relative to Reputation, Earnings, Scores (*both career based and overall)*, number of flights and flight types. By default, the **Pilot's Table** is sorted with you always shown first. Left click the column header to change the order from descending to ascending.

**1** **Pilots** – This button, when highlighted, indicates the **Pilots** table is the current table displayed.

**2** **Portal Categories** – This header lists all of the data fields used to sort/rank/classify pilots. It is up to the user to decide how they want the data to be sorted – low to high or high to low. Click the header fields to swap the order. The fields listed include:

**Pilot Index** – Current index of all Pilots that have uploaded flights to the **Portal**. Clicking any of the pilot's names will take you to a ***Specific Pilot Select*** area. There you may view specific information about the pilot and their flights. *See the "Specific Pilot Select" example later in this chapter for more information.*

**Current Career Level** – Corresponds to the current scoring criteria.

**Reputation** – Pilots total Portal Reputation.

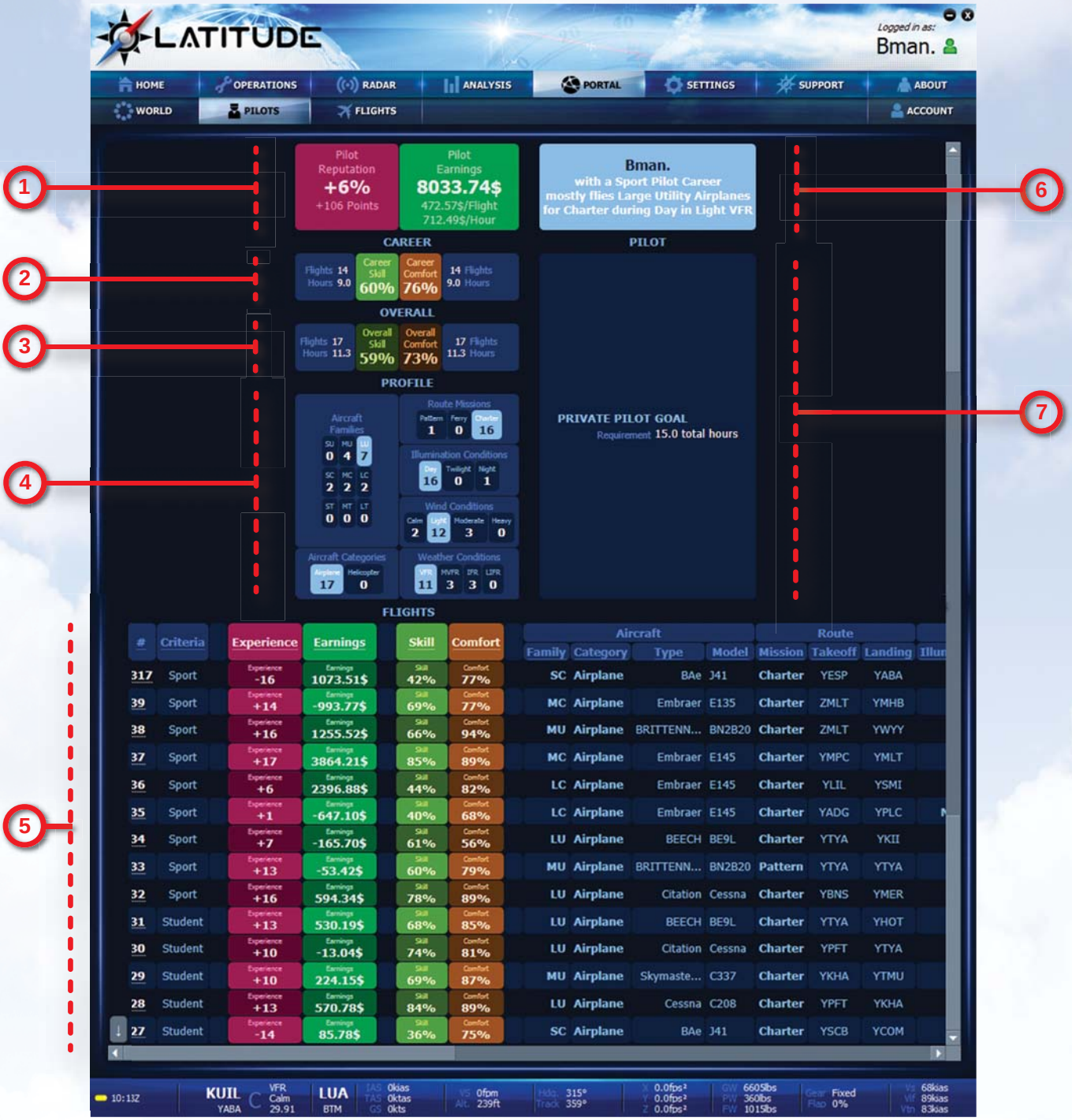
**PORTAL: PILOTS TABLE** *(continued)*

**3** **Show More** – This button will forward the Pilot Table to the next page of pilots. On the following pages there will be both an up and down arrow to toggle pilot pages forward or backward.

**4** **Account Settings** – This button allows you to sign-up or modify **Portal** account settings. The pilot must be logged into the **Portal** to upload flights and view other pilot scores, rankings and earnings. If you cannot view any information in the **Portal** tables, verify that the *Logged in As:* icon is illuminated green. If the **Portal** logged-on status does not indicate a green connection status, check account settings and log into the **Portal** again.

**5** **Scroll Bar** – This scroll bar will pan the content left/right within the **Portal** window. There is additional information on the table views and the scroll bars must be used to view additional data.

## PORTAL: PILOT SELECT




The **Pilot Select** section is an overview of a pilot's overall online **Portal** "life". The pilot's Reputation, Earnings, Career Level and Scores, Overall Scores, Pilot Profile, Recent Flights and Career advancement goal and requirements are displayed. You can review any pilot on the **Portal** – *not just your own profile.*

**PORTAL: PILOT SELECT** *(continued)*

**1** **Reputation & Earnings** – Displays the pilot's overall Reputation *(Experience Points below)* and Total Pilot Earnings *(average per flight/hour below)*. Refer to ***Part IV: Career, Reputation and Earnings*** for additional information on how careers, reputation and earnings are gained or lost.

**2** **Career Skill and Comfort Scores** – Displays the pilot's current career skill and comfort score rolling average. The number of flights and logged time to the career are listed below. *Note: Not all flights of the career level may be tabulated in the rolling average total.* The number of flights shown is dependent upon which Career Advancement Goals have been met regarding flight time logged to the career level and the number of flights logged to the career level. Refer to ***Part IV: Career, Reputation and Earnings*** for additional information on how career level advancement and demotion works.

**3** **Overall Skill and Comfort Scores** – Displays the pilot's overall average Skill and Comfort scores, number of flights and flight time logged to the portal. The overall average may not be the same as Career rolling average.

**4** **Pilot Personality Profile** – The **Pilot Personality Profile** represents the pilot's mix of aircraft type, day/night flights, route types, cloud conditions *(based on a blend of your departure and arrival weather)* and wind conditions. This will begin to define what type of pilot you are – what you fly, how you fly and type of conditions you typical fly in. This is not a good/bad indicator but rather a pilot persona picture. Each time a flight is uploaded to the **Portal**, the **Pilot Personality Profile** is updated to reflect the current statistics. See ***Part IV: Career, Reputation and Earnings*** section for more detailed information regarding Plan Route types.

**Aircraft Family** – Indicates what aircraft family types have been used to conduct each of your flights uploaded to the **Portal**. The **Aircraft Family** types are distinguished by the following weight classes:

| | |
|---|---|
| **SU** (Small Utility) | 0 ~ 3125 lbs |
| **MU** (Medium Utility) | 3126 ~ 6250 lbs |
| **LU** (Large Utility) | 6251 ~ 12,500 lbs |
| | |
| **SC** (Small Commuter) | 12,501 ~ 25,000 lbs |
| **MC** (Medium Commuter) | 25,001 ~ 50,000 lbs |
| **LC** (Large Commuter) | 50,001 ~ 100,000 lbs |
| | |
| **ST** (Small Transport) | 100,001 ~ 250,000 lbs |
| **MT** (Medium Transport) | 250,001 ~ 500,000 lbs |
| **LT** (Large Transport) | 500,000 + lbs |

**5** **Flight Log** – Displays flights that are being evaluated for your career score. If there's an arrow in the bottom left corner of the flight log, this will navigate to all the remaining flights not being used for career advancement requirements.

**6** **Basic Pilot Information** – Displays the basic pilot information – pilot name, current career level and base level pilot persona.

**7** **Career Goal and Advancement Requirements** – Displays the career advancement goal and remaining requirements to be achieved before the pilot is promoted to the next career level. As goals have been achieved, the requirement will drop from the list. Only the goals displayed in this section are the requirements remaining for promotion.

## PORTAL: FLIGHTS TABLE

LATITUDE
Logged in as:
Bman.
HOME
OPERATIONS
RADAR
ANALYSIS
PORTAL
SETTINGS
SUPPORT
ABOUT
WORLD
PILOTS
FLIGHTS
ACCOUNT
1
2
3
4
5
# Pilot Criteria Experience Earnings Skill Comfort Flight Date & Time Period Aircraft Family Category Type
163 Charles Earl Student +6 -1664.18$ 61% 86% 12/10/13 21:16 Day LU Airplane Cessna
161 Bob G. Student +8 -13426.87$ 78% 81% 12/10/28 19:21 Day ST Airplane BOEING
162 Douglas Reid Private +10 13129.69$ 66% 59% 12/10/28 22:21 Night ST Airplane BOEING
159 Peter Sport +14 206.90$ 88% 92% 12/10/27 13:16 Day LU Airplane PILATUS
160 Jim T Student +6 -49399.81$ 21% 24% 12/10/28 17:15 Night ST Airplane BOEING
158 glenm Sport +11 2773.21$ 68% 81% 12/10/28 19:17 Day ST Airplane BOEING
155 Dan_Schultz Sport -17 -5.95$ 31% 62% 12/10/28 14:31 Day MU Airplane BRITTENN...
154 Dan_Schultz Sport +13 255.41$ 67% 92% 12/10/28 14:29 Twilight SU Airplane Cessna
153 Tom Riley Private +14 -188.20$ 72% 85% 12/10/28 17:21 Day SC Airplane BEECH
157 Douglas Reid Private +12 33886.63$ 78% 74% 12/10/28 13:46 Day ST Airplane BOEING
152 Dan_Schultz Sport +6 11994.11$ 52% 81% 12/10/28 14:07 Day ST Airplane BOEING
156 Jim T Student -5 -20600.48$ 53% 78% 12/10/28 11:57 Day ST Airplane BOEING
151 Tom Riley Private +11 21092.52$ 74% 74% 12/10/28 14:19 Day ST Airplane BOEING
150 Douglas Reid Private +16 25801.95$ 87% 76% 12/10/28 09:37 Day ST Airplane BOEING
Connecting
None
N/A

The **Flights Table** is a tabulated list of all flights that have been uploaded to the **Portal**. From this page you can sort the table columns to see where specific flights rank amongst your fellow pilot's flights relative to reputation, earnings and scores. The Flights Table by default sorted with a descending order from most current flight uploaded to the latest flight uploaded.

**1** **Flights** – This button, when highlighted, indicates the Flights table is the current table displayed. Selecting Flights will display a Flight Table.

**2** **Flight Number** – Lists the flight number chronologically ordered to when the flight was uploaded to the **Portal**. These numbers are static and will always be associated to the specific flight to the right of the flight number. Clicking on the flight number will take you to the Specific Flight analysis page. That page will display the scoring, earning and experience points associated with the selected flight. See the ***Flight Select*** example on the next page for more information.

**3** **Pilot** – Indicates the pilot who conducted the flight. Clicking the pilot name on this page will navigate to the **Pilot Select** page.

**4** **Show More** – This button will forward the Pilot Table to the next page of pilots. On the following pages there will be up and down arrows to toggle pilot pages forward and backward.

**5** **Scroll Bar** – This scroll bar will pan the content left/right within the **Portal** window. There is additional information on the table views and the scroll bars must be used to view additional data.

## PORTAL: FLIGHT SELECT

The **Flight Select** section is very similar to the **Analysis** section but with the inclusion of Experience Points, earnings and a fixed scoring criteria based on the pilot's career level. As noted previously, only complete flights that are uploaded to the **Portal** will take part in the online community. Only these flights will generate experience points and revenue.

**1** **Experience Points & Earnings** – *Experience Points and Earnings* accumulated during this particular flight. Clicking the Earnings area will display a pop-up with an *Earnings* summary. See ***Part IV: Career, Reputation and Earnings Guide*** for additional information about how earnings for each particular flight are generated.

**2** **Overall Score** – Indicates the flights overall score. The total score is not an average of each flight phase score but rather the "Perceptual" based score where higher degree deductions have higher impacts on the Overall score. The green scores indicate Skill and the orange scores indicate Comfort. Refer to the **Analysis** section description for more information regarding the Overall Flight Score.

**3** **Phase Scores** – These fields (and all other proceeding flight phases) display the phase Skill & Comfort scores. The scores viewed on the **Portal** may not match what you see on the **Analysis** page *(non-portal)* as the scores on this page are judged based on the Pilot's career level. Since the scoring criteria on the **Analysis** page are variable, the scores indicated on the **Portal** page may be higher or lower. If the same judging criteria is set on the **Analysis** page as the pilot's career level on the **Portal**, the data will be identical for all scored phases.

**PORTAL: FLIGHT SELECT** *(continued)*

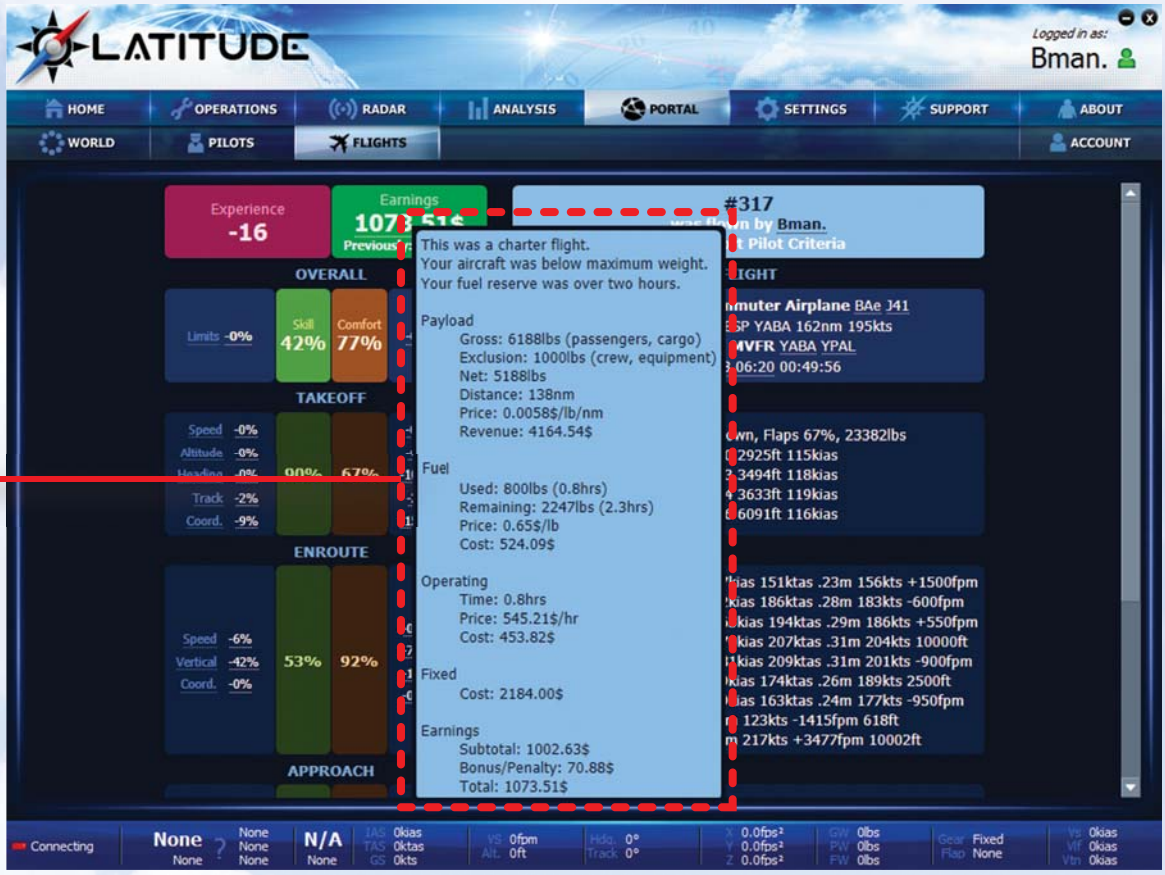
**4** **Pilot Name & Career** – Indicates the pilot's name and current Portal Career Level. The career level sets the scoring criteria for all flight phases and scoring categories. Clicking the pilot's name will take you to the pilot's overall **Portal** bios.

**5** **General Flight Information** – This area lists the specifics of your flight. Aircraft make, model, weather conditions during departure and arrival, total distance flown and average speed over the entire route. Clicking any of the fields will bring up a window displaying specific information as listed below:

Clicking the Aircraft, Specific fields will display Maximum Takeoff Weight (MTOW), Operating Weight (OEW), Maximum Passenger Weight (MPW) and Maximum Fuel Weight (MFW).

Clicking the Conditions field will display the raw METAR information at the selected airfield.

## PORTAL: FLIGHT SELECT: EARNINGS POP-UP




**1** **Earnings Pop-Up** – This pop-up window displays the breakdown of the current flight's revenue and expenses. The *Earnings* is simply defined as (Income – Expense + Bonus = Earnings). A comprehensive explanation of the Earning system can be found in ***Part IV: Career, Reputation and Earnings Guide.*** From this pop-up you can view the following information:

**Payload**:

**Takeoff Weight** – Total payload weight including exclusion weight

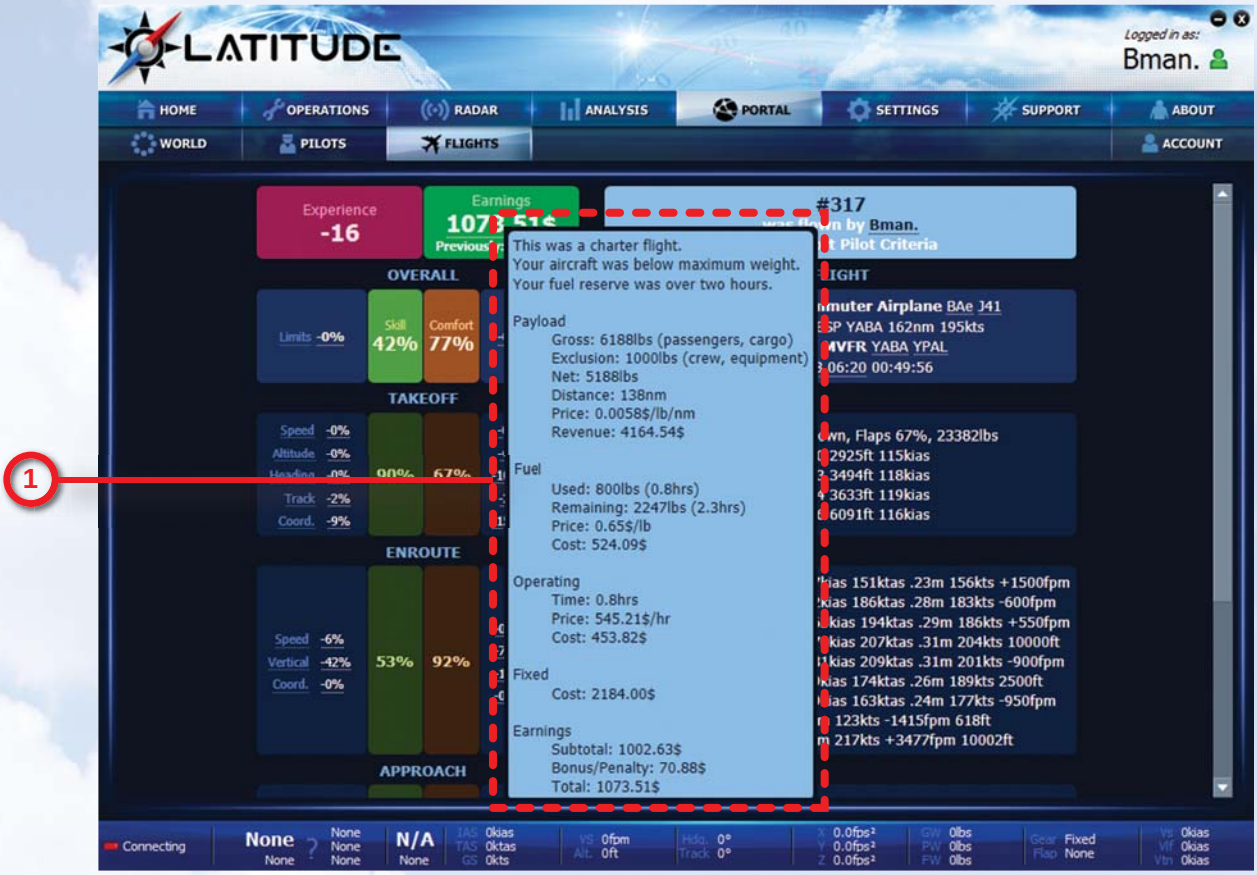
**Exclusions** – Weight on the aircraft that is non-revenue generating. The exclusion weight is automatically determined based on the MTOW of the aircraft. The actual exclusion weight will be a random variation versus a static weight. This adds to the dynamic nature of the flight crew and associated baggage. If MTOW, MPW and MLW are exceeded during a flight, the overages are added to the exclusion weight which lessens the flights earnings potential.

**Distance** – Point-to-point distance from departure to arrival fields. This is the distance per nm payload will be paying you for.

**Price** – This is the price per lb/nm paid. The cost shown is inclusive of the *Comfort Score* multiplier. A higher passenger Comfort score of a flight the higher lb/nm price paid.

**Revenue** – Total revenue of the flight.

**PORTAL: FLIGHT SELECT: EARNINGS POP-UP** *(continued)*




**Fuel**:

**Used** – Amount of fuel burned during the flight.

**Remaining** – Amount of fuel remaining at end of flight.

**Price** – Price paid per lb. of fuel. Under $1.00 and the aircraft landed with more than 1.0 hours of fuel reserves. Over $1.00 the plane landed with less than 1.0 hours of fuel reserves. See Part IV: Career, Reputation and Economy Guide.

**Cost** – Total fuel expense for this flight.

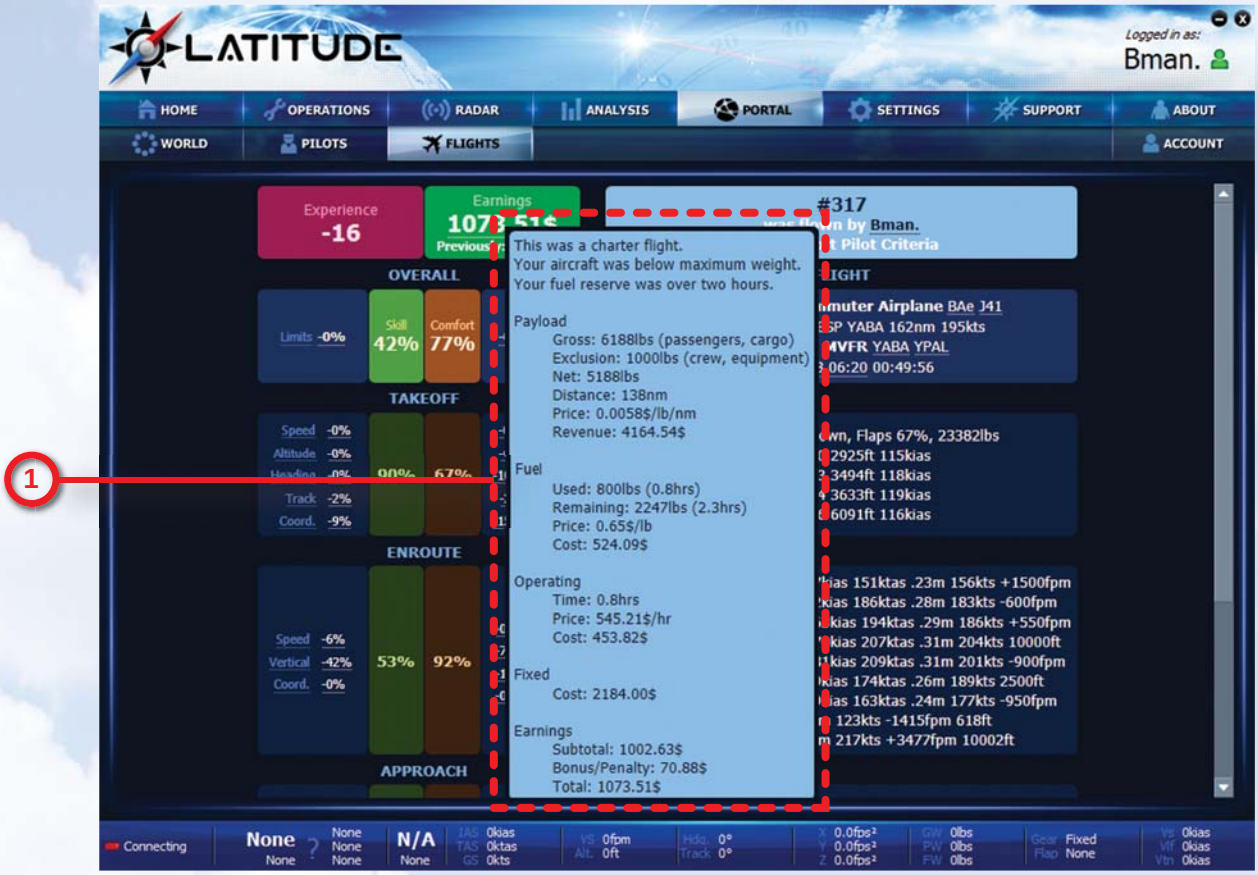
**Operating**:

**Hours** – Flight duration.

**Price** – Cost per hour of the plane based on aircraft MTOW and flight duration. This value is inclusive of the *Skill Score* multiplier of the flight. A higher skill score equates to a lower operating costs.

**Cost** – Total operating expense of the aircraft.

**PORTAL: FLIGHT SELECT: EARNINGS POP-UP** *(continued)*




**Fixed**:

**Cost** – Fixed cost based on the pilot's *Career Level*. A higher career level equates to a lower fixed cost.

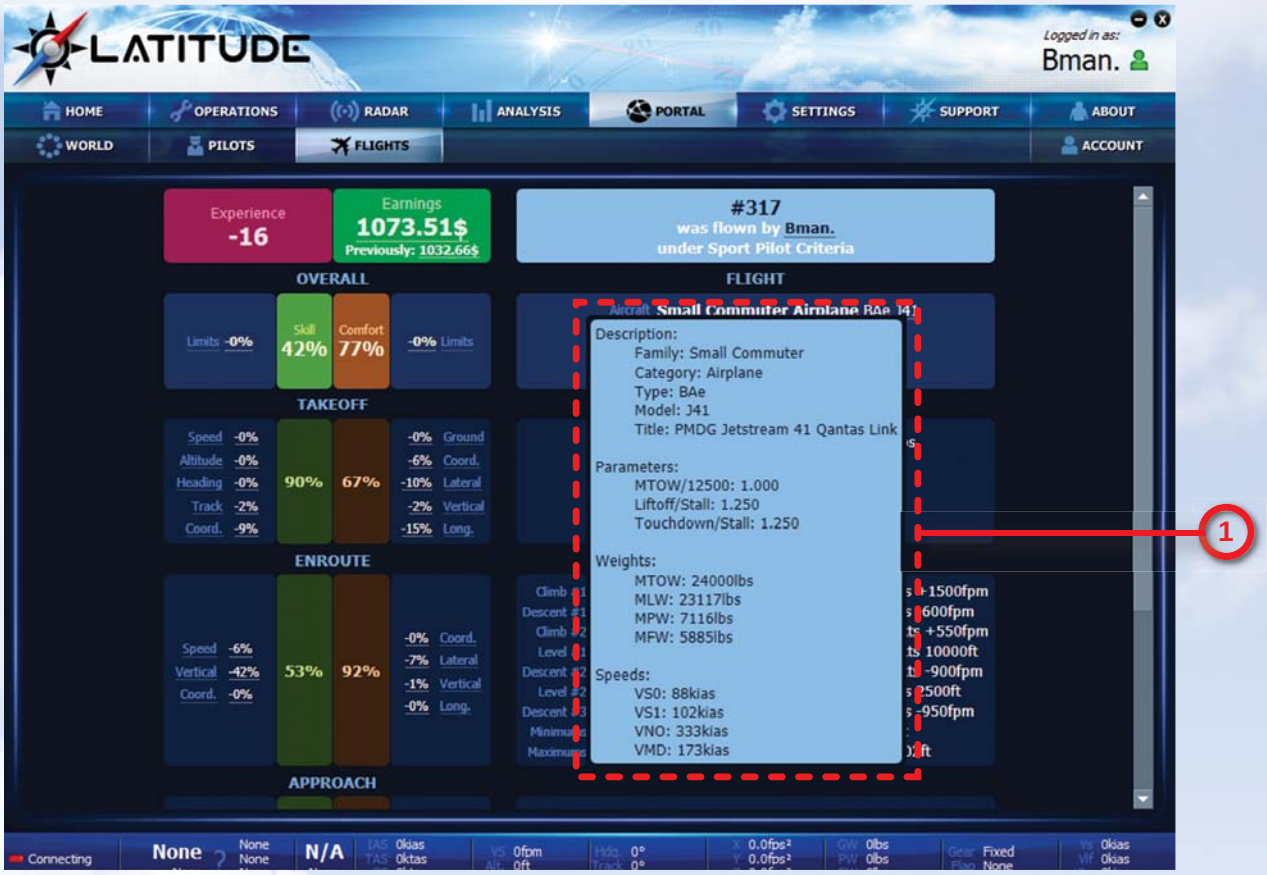
**Earnings**:

**Sub-Total** – This sub-total is the sum of revenue minus expenses.

**Bonus/Penalty** – Bonus or Penalty based on the pilot's reputation.

**Total** – The flights total revenue profit or loss.

## PORTAL: FLIGHT SELECT: AIRCRAFT INFORMATION POP-UP

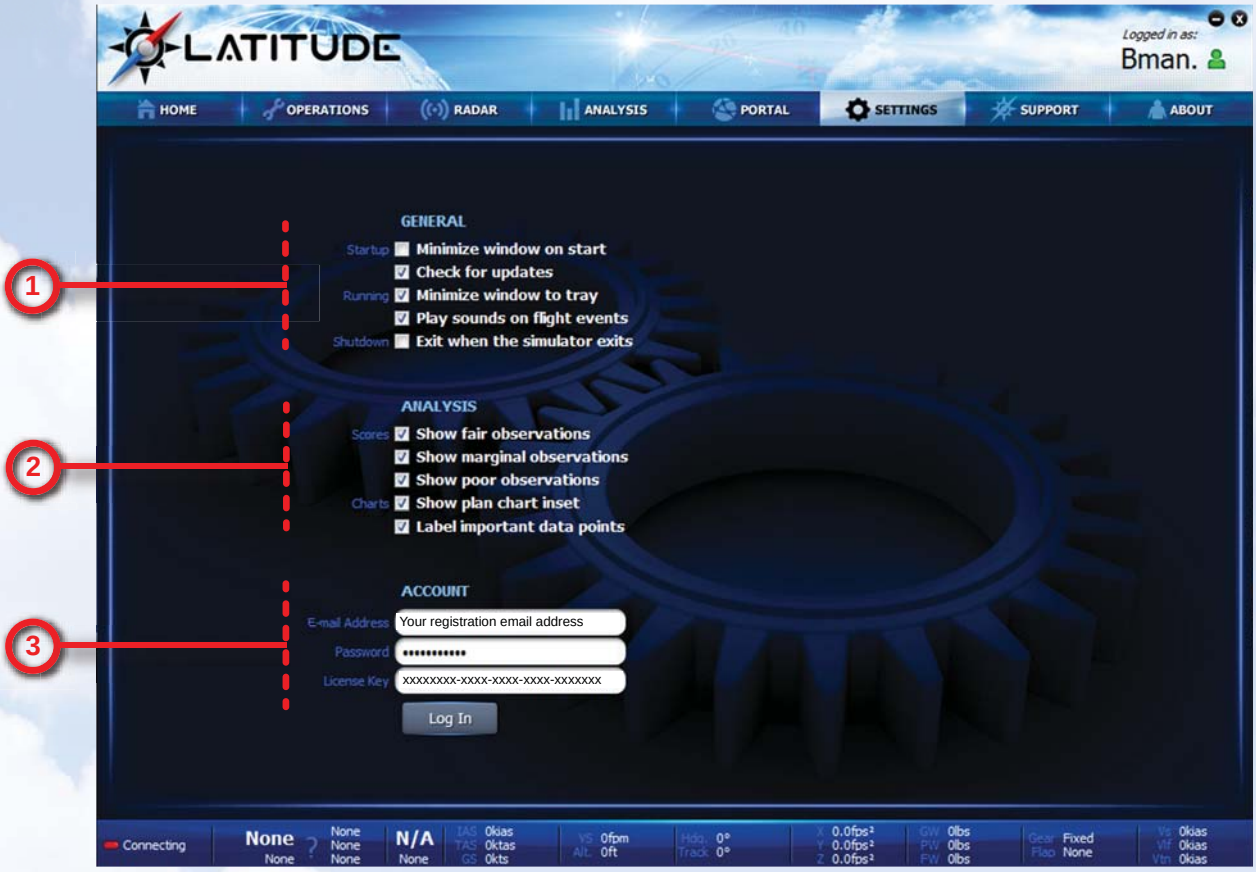



**1** **Aircraft Information Popup** – Lists the specifics of your aircraft used to conduct the flight, including the *Aircraft Parameters Ratios* that were in effect during the flight. This pop-up is a good place to cross reference weights and speeds when planning your route. **Remember to never exceed the MTOW, MLW, MPW and MFW if possible and note the stall speeds for liftoff and landing reference.**

Maximum Takeoff Weight (MTOW)
Maximum Landing Weight (MLW)
Maximum Payload Weight (MPW)
Maximum Fuel Weight (MFW)

VS0 – Stall Speed (gear & flaps deployed)
VS1 – Stall Speed (gear & flaps retracted)
VNO – Maximum Structural Cruise Speed
VMD – Best Range Speed

## SETTINGS




**1** **General Settings** – These fields adjust the display operation of Latitude.

**2** **Analysis** – Toggles display information within the **Analysis** page.

**3** **Account Information** – This is your **Portal** login information and Latitude license key. The e-mail address is the address used to register for **Portal** access. The license key is delivered to you via e-mail. You must have a valid license key to access the **Portal**.

The experience Latitude provides to your simulator environment revolves around judging your flights accuracy, efficiency and passenger comfort. Latitude will first record your flight and then score your flight once the flight is completed. While it is important to understand that Latitude is observing the pilot's every move, it's also important to understand what criteria Latitude collects during observation to ultimately judge your flight.

## OBSERVATION

Latitude generates the resulting scores, earnings, reputation and career ranking by taking continuous measurements during your flights. These measurements occur at short intervals (12 times a second) to create an accurate picture of how your flight transpired. These measurements are stored in a log file on your computer that will be analyzed by Latitude to determine how you have flown compared to how you should have flown.

Latitude will automatically start and stop observation recording at the appropriate times assuming Latitude is connected to the simulator. Optimally you want to have Latitude up and running prior to leaving the parking space. The reasons for starting Latitude prior to heading to the runway are twofold. One, you use Latitude for estimating fuel burn, loading the fuel and payload, reviewing takeoff and touchdown speeds and cross checking all critical weights prior to departure. See Part II: Desktop Client & Portal Guide for additional loading information. Two, only complete flights containing all four flight phases will be accepted into the online Portal. The four primary scoring phases are:

**Takeoff**
**Enroute**
**Approach**
**Landing**

These four phases of flight will be discussed in more detail in the following sections of this guide. In the event you forget to start Latitude prior to the aircraft's designated recording initiation trigger speed, you will have a partial score of the remaining flight phases completed through landing. These scores will only be visible under the desktop client analysis page. Flights that do not contain all four phases will be considered incomplete and cannot be uploaded to the portal. If your flight does not contain a landing phase, in cases of computer or simulator crashes, no scoring will be available.

If you were to practice approaches and landings from a 'slew' or saved flight position, the takeoff and enroute sections may be eliminated from the score results. These flights can still be reviewed from the Desktop Client, just not uploaded and stored on the portal. Latitude will begin and end observation recording when the aircraft has reached a specific calculated speed. Once this trigger speed has been reached, or the plane becomes airborne, Latitude will announce that recording has started and announce the expected liftoff speed. Upon reaching the trigger speed after landing, Latitude will announce 'accept' and your scores will automatically be displayed in FSX and Desktop Client. Once this announcement is heard, recording has been concluded. Taxiing performance is not part of the flight observations.

**Recording Initiation: ½ (Vs0) or 30 knots, which ever is less or when the plane has become airborne**

**Recording Termination: 15 knots or ¼ (VS1) - whichever is less**

## IMPORTANT NOTE:

In the event you forget to start Latitude prior to the aircraft's designated recording initiation trigger speed, you will have a partial scoring of the remaining flight phases completed through landing. These scores will only be visible under the desktop client analysis page. Flights that do not contain all four phases will be considered incomplete and cannot be uploaded to the portal. If your flight does not contain a landing phase, in cases of computer or simulator crashes, no scoring will be available.

## WARNING:

Some aircraft contain an option to "Pause at Top of Descent (TOD)" within the FMS system. When this option is used and the FMS pauses the simulator, it may "suspend" the simulator using the same sequencing that FSX uses to end a flight. It may force Latitude into thinking the flight has been terminated. Once a flight is terminated, all recorded data is deleted and scoring opportunities are lost. If you are flying with Latitude, do not use the option to pause at top of descent. However, pausing the flight simulator with the FSX defined "P" key has no impact on Latitude or scoring consequences.

## SKILL SCORING

While Latitude is recording many flight characteristics are observed. The primary metrics Latitude uses in calculating your skill scores are:

**Indicated Airspeed (IAS)**
**Vertical Rate**
**Altitude**
**Heading**
**Track**
**Coordination**

As you conduct a flight it is important to be aware of these specific metrics. These metrics all have an impact on your resulting Skill scores. See the next section Pilot Skill Scoring on how these metrics play a role in the scoring calculations.

## COMFORT SCORING

Passenger comfort in the real world can be measured by the relative changed in gravitational forces exerted upon the passenger. For example, it's not turbulent air that makes passengers queasy but rather the sudden accelerations and decelerations that makes the passenger's uncomfortable. Latitude measures these accelerations exerted upon passengers and calculates a comfort score relative to the magnitude of these forces. Turbulence is more significant than constant forces, but constant forces can be important as well. A comfortable flight for passengers is a smooth flight. When accelerations become sudden, rather than constant, the passengers will notice. The comfort related judging metrics are record during the same observation window as the skill metrics. The comfort scoring metrics are:

**Ground Contact** *(rough ground causing bounce)*
**Rudder coordination** *(yaw)*
**Lateral Acceleration** *(left/right)*
**Vertical Acceleration** *(up/down)*
**Longitudinal Acceleration** *(forward/backward)*

**Having a solid understanding of the skill and comfort scoring metrics will allow you to fly, learn and ultimately become a more proficient pilot. Neglecting a handful of these metrics will have consequences to your overall scoring. The section below, Piloting Skill Scoring, will examine why each of these parameters are implemented.**

**Score. Denial. Acceptance.**

Flying is about precision planning and smooth execution. Both must be performed to achieve desirable scores. Latitude will use a combination of techniques, such as averages, relative deviations and direct comparisons from normal operating procedures of your flight profile to determine your score. Erratic variations in any of the judging metrics such as speed, vertical path, altitude, heading, track and coordination will have consequences to your overall scoring potential.

Generally speaking, the primary metrics are analyzed using a multitude of statistical analysis and signal processing techniques such as **standard deviations, linear regression, noise filters**, etc. These methodologies allow for minor infractions from standard piloting techniques without your scores being severely impacted. However, sustained large scale deviations from conventional flying techniques will be observed and scored accordingly.

### PERCEPTUAL BASED SCORING

Each flight phase has specific metrics that Latitude will examine when your flight is analyzed. All scores range from 0 - 100% and when you begin a flight all scores start at 100%. As Latitude analyzes your flight, it will begin applying deductions to your score when bad flying techniques are exhibited.

Once a flight is completed you can review the flight scores in fine detail. Keep in mind – just because there are deductions to your score doesn't mean it was a bad flight; it simply indicates there may be improvements to be made. **A 50% score is neither good, nor bad, but rather indicates room for improvement or room for more error. A Skill or Comfort score of 87.5% will be considered near perfect as it relates to the Portal economy.** See Part IV: Career, Reputation and Economy Guide.

The cumulative score of each flight phase is not a simple average of the deductions within that phase but rather a "**Perception**" based average. This means various deductions carry different weights as they relate to phase score totals. The worst phase deductions have a higher impact on the overall cumulative score. This perceptual based scoring system corresponds to how passengers or an examiner might judge you. It's psychological in nature, but consistent.

Remember, the worst performing metrics of a flight are weighted more, since these are the areas that observers will most remember. For example a bad takeoff phase will overshadow a perfect enroute flight phase or a turbulent enroute phase will overshadow a smooth landing.

## IMPORTANT NOTE:

The cumulative score of each flight phase is not a simple average of the deductions within that phase but rather a "**Perception**" based average. This means various deductions carry different weights as they relate to phase score totals. The worst phase deductions have a higher impact on the overall cumulative score. This perceptual based scoring system corresponds to how passengers or an examiner might judge you. It's psychological in nature, but consistent.

### PERCEPTUAL BASED SCORING EXAMPLE

The takeoff scoring metrics and associated deductions in the examples below show how overall scores mimic the subjective nature of evaluation. In the example below, the pilot executed speed and track perfectly but heading incurred significant deductions.

Speed 0%
Track 0%
Heading 100%

A simple average would yield an overall takeoff score of 67%. However, under a perceptual based scoring system, the heading deductions would trump the perfect speed and track scores as this is what the observer will remember. Therefor, a 0% overall takeoff score (100% deduction) would be calculated.

Let's assume a slightly different metric deduction scenario where the highest deduction value is not so drastic between the lowest deduction values. In this example the pilot executed speed and track perfectly but heading incurred moderate deductions.

Speed 0%
Track 0%
Heading 50%

A simple average would yield an overall takeoff score of 83%. However, perceptual based scoring will yield an overall score of around 60% since the degree of deduction is narrowing the gap between the smallest deduction value and the largest. You don't want to have large deductions as the perceptual based scoring system corresponds to how passengers and examiners will judge your flight. They will focus their judgement on the negative aspects of your flight.

Perceptual based evaluations generally revolve around real world pilot certificate types: **Student, Sport, Private, Commercial, and Airline Pilot**. The higher class certificate you carry, the more stringent the examiner and passengers will evaluate your flight performance. The lower certification you have, the more lenient the observers will be. Latitude will progressively curve your scores based on specific career judging criteria.

## SCORING CRITERIA

Every scoring deduction has some flexibility. How critical or lenient the Latitude scoring is on your flying proficiency is dependent upon the career judging criteria. This means that you can deviate from the publish standards, such as liftoff speed **(Vlf)**, by some margin and not receive scoring deductions. The percentage of allowable flexibility or "grace" directly correlates to the career level of the pilot. As you become a more skilled and proficient pilot, the scoring standards become increasingly rigid. All career levels will have some leeway and they range from 15% for Student Pilots to a very critical 3% for Airline Pilots. As in the real world, students are expected to make mistakes and learn from them as they progress towards a Private Pilot certification. As you inch your way from student to ATP you will begin to see the effects of bad piloting but at the same time you will be more attuned to paying attention to the metrics that matter. The scoring criteria and the "grace" associated with each certificate type is:

## CAREER CRITERIA LEEWAY:

| | |
|---|---|
| **Student Pilot:** | **15%** |
| **Sport Pilot:** | **12%** |
| **Private Pilot:** | **9%** |
| **Commercial Pilot:** | **6%** |
| **Airline Pilot:** | **3%** |

**Example:** The vertical metric deductions are based on the ratio between the vertical speed at the point of touchdown over the average vertical speed from 50' above touchdown. The ratio *between* the vertical speed is what is critical in this example. A student pilot may have a low ratio between these two vertical speeds of 200 FPM touchdown / 450 FPM average. This low ratio could would indicate the student pilot touched down at a high vertical rate but relative to the average vertical speed from 50' AGL, this ratio is fair. Under student pilot criteria, the scoring deduction will be less for this low ratio. However, if the scoring criteria is changed to Airline Pilot, the ratio must be high. Using this same example under Airline Pilot scoring criteria, Latitude would be less forgiving for this low ratio. At Airline Pilot, Latitude will be looking for a high ratio such as 75 FPM / 450 FPM. As the career judging criteria increases, the deduction grace decreases.

The career scoring criteria also determines the relative ***impacts*** each scoring metric has in calculating each flight phase score. As the scoring criteria changes from student to airline pilot the metric impacts become increasingly more important. The default ***impacts*** are based on a Private Pilot level but are adjusted up or down for the actual scoring criteria level. Below Private Pilot *(Sport)* all High impacts are dropped a level and contain only a mix of Low and Medium impacts. Above Private scoring criteria *(Commercial)*, conversely, all Low impacts are raised one level to have a mix of only Medium and High impacts. At Student Pilot all impacts are Low and at Airline Pilot all categories are scored as High impacting.

**See the table on the next page for metric deduction impacts.**

## DEFAULT PRIVATE PILOT METRIC SCORING IMPACTS

### SKILL

**Takeoff:**

| | |
|---|---|
| Skill Speed = | MEDIUM |
| Skill Altitude = | HIGH |
| Skill Heading = | HIGH |
| Skill Track = | HIGH |
| Skill Coord. = | LOW |

**Enroute:**

| | |
|---|---|
| Skill Speed = | MEDIUM |
| Skill Vertical = | LOW |
| Skill Coord. = | HIGH |

**Approach:**

| | |
|---|---|
| Skill Speed = | MEDIUM |
| Skill Vertical = | MEDIUM |
| Skill Track = | MEDIUM |
| Skill Coord = | LOW |

**Landing:**

| | |
|---|---|
| Skill Speed = | MEDIUM |
| Skill Vertical = | LOW |
| Skill Altitude = | HIGH |
| Skill Heading = | HIGH |
| Skill Track = | HIGH |
| Skill Coord. = | LOW |

### COMFORT

**Takeoff**:

| | |
|---|---|
| Comfort Ground = | HIGH |
| Comfort Coord. = | LOW |
| Comfort Lateral = | MEDIUM |
| Comfort Vertical = | HIGH |
| Comfort Long. = | LOW |

**Enroute:**

| | |
|---|---|
| Comfort Coord. = | HIGH |
| Comfort Lateral = | MEDIUM |
| Comfort Vertical = | HIGH |
| Comfort Long. = | LOW |

Approach:

| | |
|---|---|
| Comfort Coord. = | LOW |
| Comfort Lateral = | MEDIUM |
| Comfort Vertical = | HIGH |
| Comfort Long. = | LOW |

Landing:

| | |
|---|---|
| Comfort Ground = | HIGH |
| Comfort Coord. = | LOW |
| Comfort Lateral = | MEDIUM |
| Comfort Vertical = | HIGH |
| Comfort Long. = | LOW |

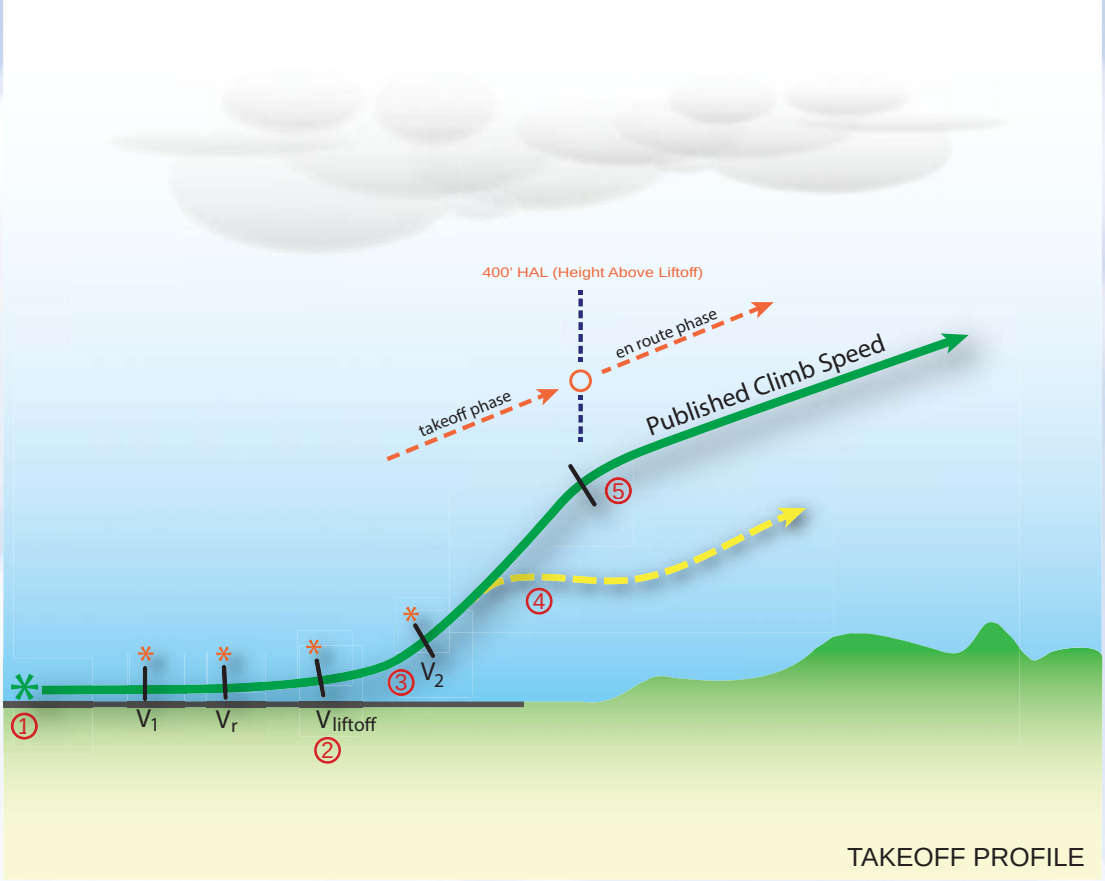
As in the real world, students are expected to make mistakes and learn from them as they progress towards a Private Pilot certification or beyond. The scoring criteria leeway and how deductions impact your overall score reflect how a pilot should learn and progress. The less you deviate from means, averages and norms, the more smoothly and precise you have executed your flight. This ultimately means the better you will score. The higher the career criteria the better one should execute the flight. To aid in pinpointing your strong or weak areas, the metrics are analyzed separately in each of the distinct flight phases. The four phases are:

**Takeoff**
**En Route**
**Approach**
**Landing**

The critical scoring metrics criteria will be explained in more detail below as it pertains to each phase of flight. Additional information relating to perceptual based scoring and how the metric deductions are expressed in a numerical score with comments is also be discussed in Part II: Desktop Client & Portal Guide.

How you navigate your aircraft down the runway plays an important role in establishing your score. The speed, heading, track and coordination metrics all rely on one another and it's important that you pay attention to them as you begin your ground roll and takeoff. Much like laying a solid foundation for a great landing by first having a stabilized approach, you must first have a stabilized and coordinated ground roll to have a great takeoff.

### TAKEOFF PROFILE DIAGRAM

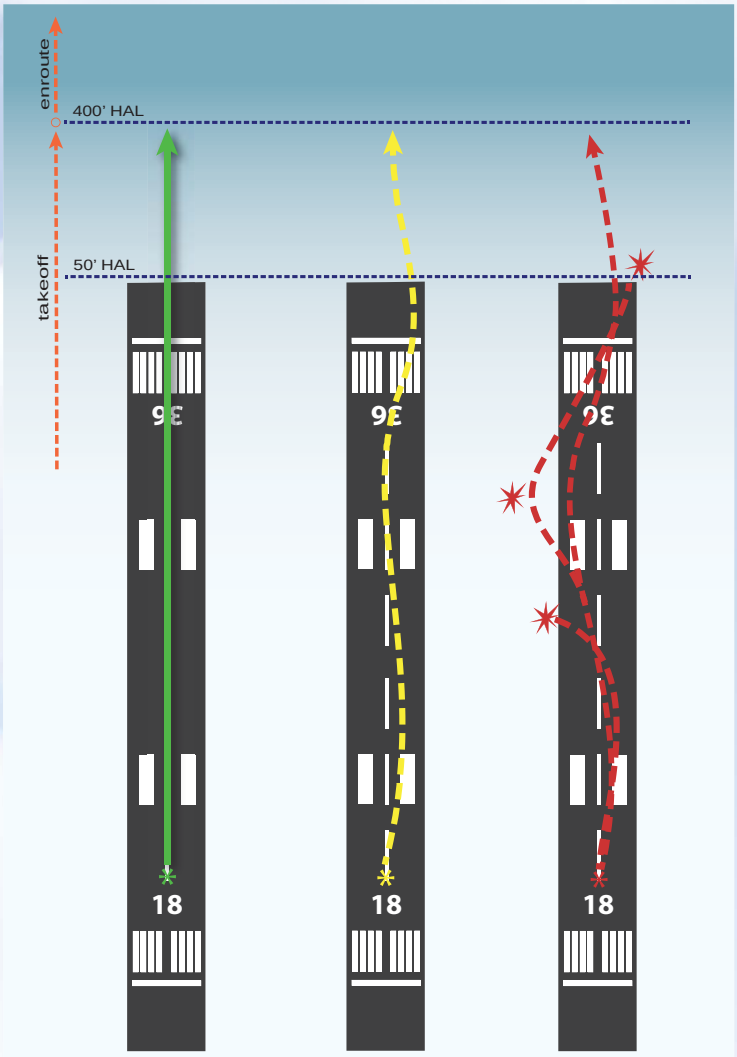



TAKEOFF PROFILE

### KEYNOTE LEGEND

**1)** Smooth acceleration during ground roll
**2)** Liftoff should occur above V1 and Vr but below V2
**3)** Increased airspeed through V2
**4)** Don't sink during climb out
**5)** Accelerate to the published climb speed

## TAKEOFF PLAN DIAGRAM




TAKEOFF PLAN

**WARNING:**

Some 3rd party addon airfield sceneries may have different runway surface types and/or locations relative to the default FSX runway locations. Typically this is not a problem since Latitude will begin to note surface deviations if there is a surface change encountered during the touchdown and rollout. If the addon airfield is completely offset from the FSX airfield location and the aircraft remains on the same surface type, no deductions will be encountered. However, in rare cases if the runways (default FSX and addon scenery) are offset from one another but overlap at some location, Latitude may think the aircraft has made a surface change where these runways intersect. If you encounter one of these instances, please notify us on the support forums for further investigation.

## KEYNOTE LEGEND

| | |
|---|---|
| **Green = Normal** | Ground roll should be straight with small rudder deviations to maintain track and coordination. |
| **Yellow = Caution** | Penalties will be incurred for large rudder deflections. Your coordination will also begin to be penalized due to skidding if rudder deflection is too great. Potential penalties for poor heading alignment during liftoff. |
| **Red = Warning** | Higher penalties will be assessed for extreme track deflections and poor coordination and skidding. Large sweeping tracks that cause runway surface changes will negatively impact scores. |

Takeoff phase begins at ½ of (Vs0) or 30 knots, whichever is less, or when the plane becomes airborne. Latitude will announce 'recording' and the expected liftoff speeds once recording has commenced. The takeoff phase concludes at an altitude of 400' HAL (Height Above Liftoff).

## TAKEOFF SCORING

During this phase the following metrics are used to generate your phase score so keep a watchful eye on them during ground roll, liftoff and initial climb.

- **Speed** - The speed metric for this phase is specific to the Vlf (liftoff speed) based on loading conditions, aircraft type/MTOW and flap configuration. The goal is to liftoff as close to the indicated Vlf speed as possible. The further away from the expected liftoff speed, above or below, the larger the deduction value.

- **Altitude** - The altitude metric for this phase is specific to any bouncing that occurs during ground roll or sinking once liftoff has occurred. The goal is to be deliberate, but smooth, with your liftoff and maintain a positive rate of climb. Bounces and sinking after liftoff will result in deductions.

- **Heading** - The heading metric for this phase is specific to the crosswind alignment at the point of liftoff. The goal is to have the heading aligned with the ground track. Heading that is not aligned with the ground track at liftoff will result in deductions. The maximum permissible heading deviation at liftoff before there is a 100% criteria deduction is 30°.

- **Track** - The track metric for this phase is specific to the track oscillation (the left and right weave) during the ground roll. The goal is to have the smallest degree of track variation from the point Latitude recording begins. With this in mind, it's critical that your plane is aligned with the runway heading or intended departure heading once Latitude begins recording. Small rudder adjustments for track correction are far better than large rudders swings to get back on track. Think of small rudder adjustments *keeping* your aircraft on track, where as, large rudder swings put your aircraft *back* on track. You want to always be on track, not getting back on track. The larger your total track variation the larger the scoring deduction imposed. The maximum permissible variation on either side of the originating track before there is a 100% criteria deduction is 15°.

  If you run off the runway, the permissible deviation for track is reduced. The reduction is based on the speed at which you run off the runway. The higher the speed the larger the deduction. Run-offs are detected via FSX surface changes. Multiple surface changes will have multiple track limit reductions. **See the warning note about FSX runway surface changes on the takeoff diagram above.**

- **Coordination** - The coordination metric for this phase is specific to skidding (movement of the ball on the turn coordinator gauge) that occurs on the ground or in the air to 400' AGL. The goal is to minimize the amount of track corrections with the rudder during ground roll. The more rudder inputs the pilot employs, the more the lateral forces applied to the plane thus causing the "ball" to move. Just after liftoff, if you are not coordinated your aircraft plane will be in a continuous bank which will also impact your track score.

### TAKEOFF TIPS

- Smooth acceleration: idle to full thrust/throttle in 5 seconds, partial throttle to start moving and line up.
- Keep center line with small and frequent rudder movements. This limits your overall deviation from the point of recording initializes. Large rudder inputs are not desirable as this means you a large track deviation, coordination issue and likely will have a hard time with correct alignment heading at liftoff.
- Smooth transition from Vr to Vlf (limit the Y and Z acceleration). You will want a smooth rotation of around 3+ seconds prior to liftoff. Keep in mind liftoff is > V1 > Vr < V2. If there is no published V2, Vliftoff should occur around 5-10 knots above Vr.
- Maintain track and coordination to 400’ HAL (Height Above Liftoff) taking into account any crosswind conditions.
- Crosscheck Latitude’s predicted liftoff speed with POH or FMS predicted speed and verify the speeds are in agreement. If they are not in agreement, refer to Part II: Desktop Client & Portal Guide for additional information.

While there is a flurry of activity happening in rapid succession during the takeoff phase of flight, there are an equal number of events the pilot will encounter during the enroute phase of flight. Although events don't occur at such a rapid pace, there is plenty planning involved in executing multiple enroute segments to compose a good overall enroute score. The enroute phase is composed of three primary segments:

**Climb**
**Level**
**Descent**

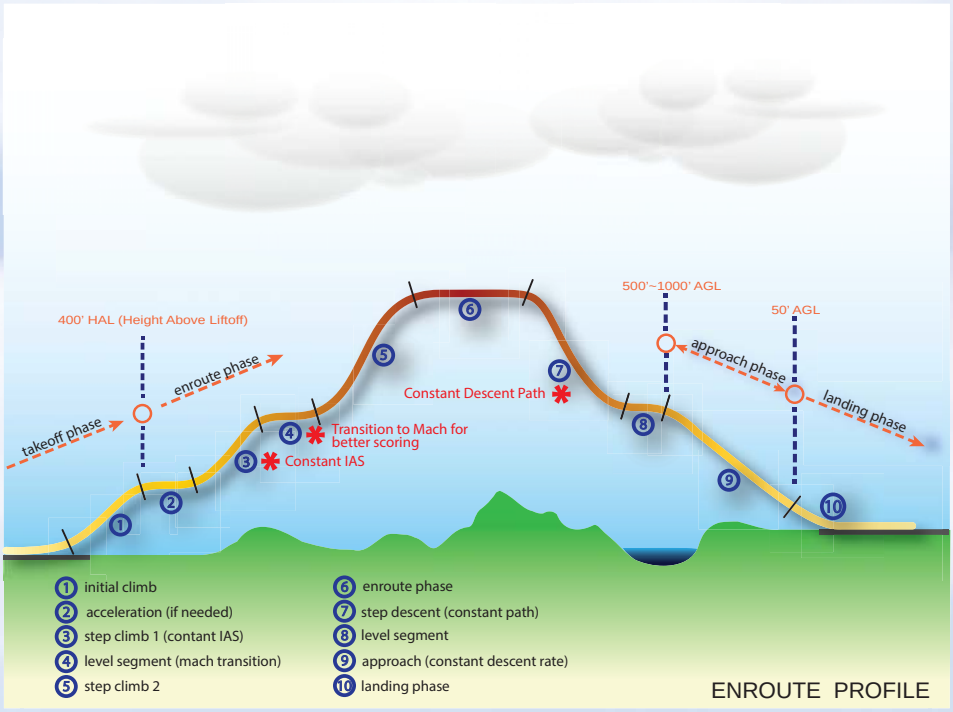
The minimum enroute segment duration is 15 seconds and the enroute phases must either have a level segment or a climb and descent. Failing to achieve one of these combinations will result in an incomplete flight as there will be no phase score for the enroute phase. This 15 seconds rule also applies to segment transitions. For example, if you are in level flight and deliberately deviate from a level flight path, the deviation must occur for 15 seconds before the segment changes to a climb or descent segment. Since airplanes don't make immediate transitions from a climb to level flight or level flight to descent, there is a 5 second 'grace' period at transition zones between segments. This means the first and last 5 seconds of the segment are ignored. This aids the scoring because planes cannot make immediate changes and the '5 second' grace period will eliminate the initial, large scale deviations as your flight path and airspeed changes.

**Keys to remember about transitions:**

Segment changes take 15 seconds minimum to occur
There is a 5 second 'grace' at the beginning and end of each segment

The enroute phase begins at 400' HAL (where takeoff ends) and terminates at the Approach phase. As you near your destination, be aware of and prepared for the transition between Enroute and Approach phases as you will also starting a separate approach scoring segment. You don't want erratic flight behaviors when you are transitioning to the Approach phase. Stay 'ahead' of your plane and be prepared for each flight phase.

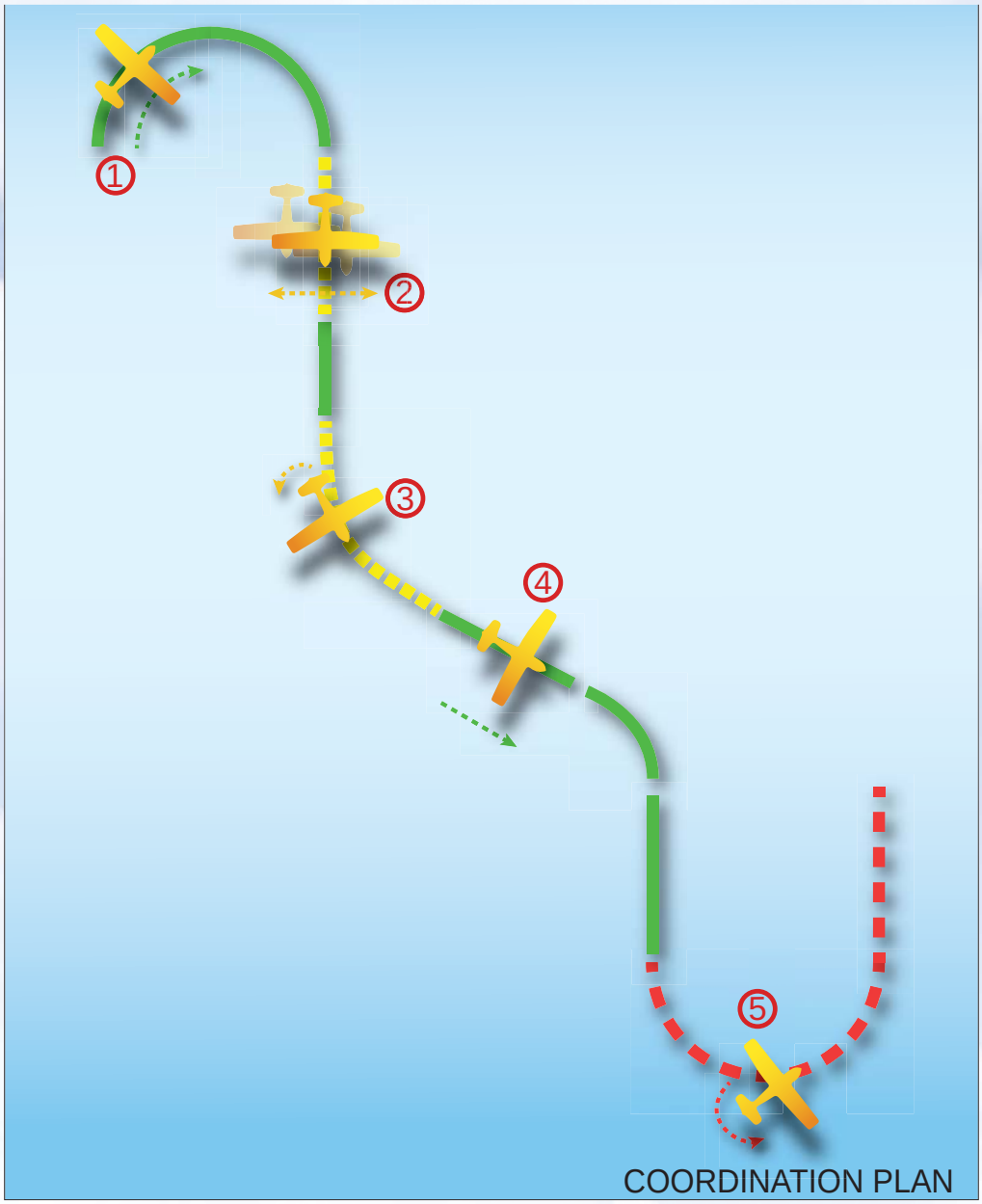
## ENROUTE PROFILE




### En Route Tips

- Accelerate to climb speed as soon as possible
- Maintain constant climb speed
- Utilize a stepped climb to split the climb into distinct scoring segments
- Switch to Mach speed (if applicable based on plane type)
- Do not cross Never Exceed Speed (Vne) and really don't cross dive speed Vd
- Make transitions between climb, level, descent deliberately
- Stay level during the level segment (no slight climbs <100 FPM) - maintain altitude
- Descend while keeping a constant path or constant rate by adjusting ground speed or vertical speed

## COORDINATION DIAGRAM




## KEYNOTE LEGEND

**Green = Normal**
**1)** Good turn coordination with no skidding.
**4)** No turbulence

**Yellow = Caution**
**2)** Penalties incurred for turbulence. Deflections to the coordination ball with moderate turbulence – find smooth air or slow down to Va (Maneuvering Speed)
**3)** Minor loss of coordination causing score deduction

**Red = Warning**
**5)** Large coordination scoring penalties

## ENROUTE PHASE SCORING

Enroute scoring is based on a composite analysis of your climb, level and descent segments. Each segment contain specific metrics to be mindful of. The metrics used to develop your flight path profile and resulting score for each phase during each enroute climb, level and descent segments are:

- **Speed** - The speed metric during an enroute segment is specific to climbs and level segments. The goal is to maintain constant climb speeds and level speeds. The greater the speed range (absolute delta) the larger the scoring deductions introduced to the climb and level segments. Tips to keep the absolute delta to a minimum are discussed below in the climb segments. The scoring deductions increase the closer the average speed is to the edge of the flight envelope (stall & Vne). A deviation that might occur in the middle of the flight envelope will have less of a scoring impact than at the edge of the envelope.

- **Vertical** (Rate/Path/Altitude) - The vertical metric during an enroute segment is specific to your level and descent profile. Level segments are scored based on altitude deviation (threshold limit of +/-250 ft) and descent is either based on constant rate (constant vertical speed FPM) or constant path (constant angle).

- **Coordination** - The coordination metric during an enroute segment is not specific to climbs, level or descent segments. Rudder coordination is analyzed during all of these segments. As previously noted, coordination is a measure of the aircraft 'skidding' (movement of the ball on the turn coordinator gauge) when there aircraft is banking without rudder input. The goal is to stay coordinated as required when making banking maneuvers. During the enroute phase it is ideal to find an altitude with little or no turbulence as this will impact both your skill and comfort scoring.

**Listed below are the segments analyzed during the enroute phase of a flight and how the specific metrics of your flight are applied to each segment.**

## CLIMBS

As noted previously the climb segments(s) is based on maintaining a constant airspeed. Once your aircraft reaches **400' HAL**, you want to attempt to reach a stable climb speed as soon as possible. The quicker your aircraft reaches a stable climb speed, the less speed variation will occur over the course of your entire climb segment. Since the scoring calculations are based on deviations, you want to maintain a constant airspeed for as long as possible during the climb phase. For lower cruises altitudes, maintaining a constant IAS during the climb phase is not too difficult. **Note: This is all that is need for smaller utility (GA) aircraft.**

For reaching higher cruise altitudes (flight levels) the constant speed theory is not as easy as just watching your IAS gauge and keeping the needle in the same location. The reason is because as an aircraft gains altitude the IAS will begin to diminish due to air density. If you were to keep the IAS in the same position during your entire climb phase, the aircraft will eventually reach a point where the aircraft won't climb at that speed. As dictated by the aircraft, a change to Mach climb usually occurs in flight levels which will begin a gradual IAS decrease. Since gradual IAS bleed off will cause a scoring deduction during climbs, you should use step climbs. The speed metric scoring forces you to step climb, which in many parts of the world is more realistic than a non-stop climb. Step climbs are also useful when you don't have enough performance to climb non-stop to your cruise altitude. This can occur with older or heavily loaded jets, or GA aircraft if the cruise climb speed is too high.

The way to combat airspeed deviations as you make extended climbs to higher cruise altitudes, is to split the climb segment into multiple climbs with a level segment in between each climb segment for a stepped climb. Keep in mind the 15 second minimum requirement for segment changes to occur. The climb profile could then be described as a climb segment, level segment (15 sec. minimum or longer for better stabilization), climb segment, level segment (15 sec. min), climb segment, etc. Utilizing a step climb technique makes the scoring segments shorter in duration thus reducing the window for airspeed deviations as IAS diminishes with increasing altitude. It also allows one segment to be scored with IAS while another segment scored with Mach. See the examples below based on a hypothetical jet situation as it climbs to cruise altitude. These examples demonstrate four different scenarios of how one might climb to cruise level and the resulting speed deviations encountered during the overall climb to cruise level. Examine this example and you will see how transitioning to Mach speed and utilizing stepped climbs is beneficial to your average airspeed deviation and ultimately enroute score as it relates to climbs.

Although there are multiple ways to manage consistency of airspeed, either following a constant IAS, combination of IAS and Mach climbs or step climbs/descents, Latitude will always apply score deductions based on which option yields the best resulting score. If IAS yields less overall deviation and less deduction than Mach speeds, IAS will be used to determine score deductions. The same holds true for Mach speeds. Ideally, for flights that have a long climb phase, a combination of the two speed holds would be used.

The following four tables demonstrate the potential scoring deductions based on a jet aircraft climb scenario and different speed management techniques one might employ. As you can see, efforts to correctly manage aircraft speeds, although more complex, are more beneficial to your enroute score.

| IAS Hold Only with No Level-Off | | | | | | | |
|---|---|---|---|---|---|---|---|
| Altitude | IAS | TAS | SSO | Mach | IAS Deviation | Mach Deviation | Phase |
| 0 | 120 | 120 | 662 | 0.18 | | | |
| 1000 | 140 | 142 | 660 | 0.22 | | | |
| 2000 | 160 | 165 | 657 | 0.25 | | | |
| 3000 | 180 | 189 | 655 | 0.29 | | | |
| 4000 | 200 | 213 | 653 | 0.33 | | | |
| 5000 | 220 | 238 | 650 | 0.37 | | | |
| 6000 | 240 | 263 | 648 | 0.41 | | | |
| 7000 | 240 | 267 | 646 | 0.41 | | | |
| 8000 | 240 | 271 | 643 | 0.42 | | | |
| 9000 | 240 | 276 | 641 | 0.43 | | | |
| 10000 | 240 | 280 | 638 | 0.44 | | | |
| 11000 | 250 | 296 | 636 | 0.47 | | | |
| 12000 | 260 | 313 | 634 | 0.49 | | | |
| 13000 | 270 | 330 | 631 | 0.52 | | | |
| 14000 | 270 | 335 | 629 | 0.53 | | | |
| 15000 | 270 | 340 | 626 | 0.54 | 20% | 45% | Climb |
| 16000 | 270 | 345 | 624 | 0.55 | | | |
| 17000 | 270 | 351 | 622 | 0.56 | | | |
| 18000 | 270 | 356 | 619 | 0.58 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 20000 | 270 | 367 | 614 | 0.60 | | | |
| 21000 | 270 | 373 | 612 | 0.61 | | | |
| 22000 | 270 | 379 | 609 | 0.62 | | | |
| 23000 | 270 | 385 | 607 | 0.63 | | | |
| 24000 | 270 | 391 | 604 | 0.65 | | | |
| 25000 | 270 | 397 | 602 | 0.66 | | | |
| 26000 | 270 | 403 | 599 | 0.67 | | | |
| 27000 | 270 | 409 | 597 | 0.69 | | | |
| 28000 | 270 | 415 | 594 | 0.70 | | | |
| 29000 | 270 | 422 | 591 | 0.71 | | | |
| 30000 | 270 | 428 | 589 | 0.73 | | | |
| Minimum Average Deviation | | | | | 20% | | |

This is an example of an aircraft during a non-stop climb segment where only the IAS speed is held. In this example, as the aircraft climbs in altitude with holding IAS, the true airspeed continues to increase. If the cruise climb IAS speed is too high for the aircraft, the desired cruise altitude may never be achieved since the aircraft cannot maintain such a high true airspeed. Also, if the IAS speed is held from takeoff to cruise, the average deviation is substantial over the entire climb segment. Remember the goal is to maintain a constant true airspeed, not indicated.

| IAS Hold Followed by Mach Hold with No Level-Off | | | | | | | |
|---|---|---|---|---|---|---|---|
| Altitude | IAS | TAS | SSO | Mach | IAS Deviation | Mach Deviation | Phase |
| 0 | 120 | 120 | 662 | 0.18 | | | |
| 1000 | 140 | 142 | 660 | 0.22 | | | |
| 2000 | 160 | 165 | 657 | 0.25 | | | |
| 3000 | 180 | 189 | 655 | 0.29 | | | |
| 4000 | 200 | 213 | 653 | 0.33 | | | |
| 5000 | 220 | 238 | 650 | 0.37 | | | |
| 6000 | 240 | 263 | 648 | 0.41 | | | |
| 7000 | 240 | 267 | 646 | 0.41 | | | |
| 8000 | 240 | 271 | 643 | 0.42 | | | |
| 9000 | 240 | 276 | 641 | 0.43 | | | |
| 10000 | 240 | 280 | 638 | 0.44 | | | |
| 11000 | 250 | 296 | 636 | 0.47 | | | |
| 12000 | 260 | 313 | 634 | 0.49 | | | |
| 13000 | 270 | 330 | 631 | 0.52 | | | |
| 14000 | 270 | 335 | 629 | 0.53 | | | |
| 15000 | 270 | 340 | 626 | 0.54 | 19% | 38% | Climb |
| 16000 | 270 | 345 | 624 | 0.55 | | | |
| 17000 | 270 | 351 | 622 | 0.56 | | | |
| 18000 | 270 | 356 | 619 | 0.58 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | IAS hold to Mach hold transition | | |
| 20000 | 270 | 367 | 614 | 0.60 | | | |
| 21000 | 265 | 366 | 612 | 0.60 | | | |
| 22000 | 260 | 365 | 609 | 0.60 | | | |
| 23000 | 255 | 363 | 607 | 0.60 | | | |
| 24000 | 250 | 362 | 604 | 0.60 | | | |
| 25000 | 245 | 360 | 602 | 0.60 | | | |
| 26000 | 240 | 358 | 599 | 0.60 | | | |
| 27000 | 235 | 356 | 597 | 0.60 | | | |
| 28000 | 230 | 354 | 594 | 0.60 | | | |
| 29000 | 225 | 351 | 591 | 0.59 | | | |
| 30000 | 220 | 349 | 589 | 0.59 | | | |
| Minimum Average Deviation | | | | | 19% | | |

This is an example of an aircraft during the same non-stop climb segment where the IAS speed is held and then transitioned to Mach hold at the altitude specified by the POH or FMS. Transitioning to Mach hold will allow the aircraft to maintain a constant cruise climb speed during a higher altitude climb. Note the IAS begins to drop-off and Mach speed is held constant. In this example, the average deviation is still substantial during the entire climb segment because there were no level segments to split the climb into individual scoring climb components.

| IAS Hold then Mach Hold with Level-Off | | | | | | | |
|---|---|---|---|---|---|---|---|
| Altitude | IAS | TAS | SSO | Mach | IAS Deviation | Mach Deviation | Phase |
| 0 | 120 | 120 | 662 | 0.18 | | | |
| 1000 | 140 | 142 | 660 | 0.22 | | | |
| 2000 | 160 | 165 | 657 | 0.25 | | | |
| 3000 | 180 | 189 | 655 | 0.29 | | | |
| 4000 | 200 | 213 | 653 | 0.33 | | | |
| 5000 | 220 | 238 | 650 | 0.37 | | | |
| 6000 | 240 | 263 | 648 | 0.41 | | | |
| 7000 | 240 | 267 | 646 | 0.41 | | | |
| 8000 | 240 | 271 | 643 | 0.42 | | | |
| 9000 | 240 | 276 | 641 | 0.43 | | | |
| 10000 | 240 | 280 | 638 | 0.44 | 22% | 38% | Climb |
| 11000 | 250 | 296 | 636 | 0.47 | | | |
| 12000 | 260 | 313 | 634 | 0.49 | | | |
| 13000 | 270 | 330 | 631 | 0.52 | | | |
| 14000 | 270 | 335 | 629 | 0.53 | | | |
| 15000 | 270 | 340 | 626 | 0.54 | | | |
| 16000 | 270 | 345 | 624 | 0.55 | | | |
| 17000 | 270 | 351 | 622 | 0.56 | | | |
| 18000 | 270 | 356 | 619 | 0.58 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | 0% | 0% | Level |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | IAS hold to Mach hold transition | | |
| 20000 | 270 | 367 | 614 | 0.60 | | | |
| 21000 | 265 | 366 | 612 | 0.60 | | | |
| 22000 | 260 | 365 | 609 | 0.60 | | | |
| 23000 | 255 | 363 | 607 | 0.60 | | | |
| 24000 | 250 | 362 | 604 | 0.60 | | | |
| 25000 | 245 | 360 | 602 | 0.60 | 8% | 1% | Climb |
| 26000 | 240 | 358 | 599 | 0.60 | | | |
| 27000 | 235 | 356 | 597 | 0.60 | | | |
| 28000 | 230 | 354 | 594 | 0.60 | | | |
| 29000 | 225 | 351 | 591 | 0.59 | | | |
| 30000 | 220 | 349 | 589 | 0.59 | | | |
| Minimum Average Deviation | | | | | 8% | | |

In this example of a climb to FL300, the aircraft conducted a step climb where the IAS speed is held followed by a level-off prior to proceeding with the rest of the climb in Mach hold. In this example, you can see that conducting a level segment during the overall climb to cruise drastically reduces the average airspeed deviations during the overall climb. This is because conducting level segments during the overall climb to cruise allows the speed deviations to be analyzed by individual climb segments versus one total climb segment. Each individual climb/level segment has a smaller total speed deviation average.

| IAS Hold then Mach Hold with Multiple Level-Offs | | | | | | | |
|---|---|---|---|---|---|---|---|
| Altitude | IAS | TAS | SSO | Mach | IAS Deviation | Mach Deviation | Phase |
| 0 | 120 | 120 | 662 | 0.18 | | | |
| 1000 | 140 | 142 | 660 | 0.22 | | | |
| 2000 | 160 | 165 | 657 | 0.25 | 12% | 14% | Climb |
| 3000 | 180 | 189 | 655 | 0.29 | | | |
| 3000 | 180 | 189 | 655 | 0.29 | | | |
| 3000 | 200 | 209 | 655 | 0.32 | 12% | 13% | Level |
| 3000 | 220 | 230 | 655 | 0.35 | | | |
| 3000 | 240 | 251 | 655 | 0.38 | | | |
| 3000 | 240 | 251 | 655 | 0.38 | | | |
| 4000 | 240 | 255 | 653 | 0.39 | | | |
| 4000 | 240 | 255 | 653 | 0.39 | | | |
| 5000 | 240 | 259 | 650 | 0.40 | | | |
| 6000 | 240 | 263 | 648 | 0.41 | | | |
| 7000 | 240 | 267 | 646 | 0.41 | | | |
| 8000 | 240 | 271 | 643 | 0.42 | | | |
| 9000 | 240 | 276 | 641 | 0.43 | | | |
| 10000 | 240 | 280 | 638 | 0.44 | | | |
| 11000 | 250 | 296 | 636 | 0.47 | 7% | 22% | Climb |
| 12000 | 260 | 313 | 634 | 0.49 | | | |
| 13000 | 270 | 330 | 631 | 0.52 | | | |
| 14000 | 270 | 335 | 629 | 0.53 | | | |
| 15000 | 270 | 340 | 626 | 0.54 | | | |
| 16000 | 270 | 345 | 624 | 0.55 | | | |
| 17000 | 270 | 351 | 622 | 0.56 | | | |
| 18000 | 270 | 356 | 619 | 0.58 | IAS hold to Mach hold transition | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | 0% | 0% | Level |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 19000 | 270 | 362 | 617 | 0.59 | | | |
| 20000 | 270 | 367 | 614 | 0.60 | | | |
| 21000 | 265 | 366 | 612 | 0.60 | | | |
| 22000 | 260 | 365 | 609 | 0.60 | | | |
| 23000 | 255 | 363 | 607 | 0.60 | | | |
| 24000 | 250 | 362 | 604 | 0.60 | | | |
| 25000 | 245 | 360 | 602 | 0.60 | 8% | 1% | Climb |
| 26000 | 240 | 358 | 599 | 0.60 | | | |
| 27000 | 235 | 356 | 597 | 0.60 | | | |
| 28000 | 230 | 354 | 594 | 0.60 | | | |
| 29000 | 225 | 351 | 591 | 0.59 | | | |
| 30000 | 220 | 349 | 589 | 0.59 | | | |
| Minimum Average Deviation | | | | | 6% | | |

In this same example of a climb to FL300, the aircraft conducted multiple steps. There was a level-off after the acceleration phase just after takeoff and a second level-off following the IAS to Mach hold transition. In this example, you can see that conducting multiple level-off segments during the overall climb to cruise drastically reduces the overall average airspeed deviations. Because level-offs separate climb segments into individually scored segments, versus one large climb segment, the average speed deviation for individual segments is much smaller. The overall climb to cruise deductions are minimized because the average speed deviations are minimized. If your flight plan includes a high altitude cruise level, your enroute deductions will be minimized by utilizing a multiple step climb procedure with an IAS to Mach hold transition.

### LEVEL

Level segments are scored based on maintaining consistent **airspeed** and **altitude**. The more your aircraft speed or altitude varies during a level segment of an enroute phase, the more scoring penalties you will incur. If your altitude increases or decreases above or below specified path deviation triggers (+/- 1° change in path) you will induce a segment change to either a descent or climb segment. While transitioning to climb or descent segments during the enroute phase is not bad, you will want to make these transitions deliberately. If you have a shallow increase or decrease in altitude without going beyond segment transition trigger points, you will have a large deviation average during the level segment which will be scored accordingly. As previously noted there is a 15 second minimum segment hold before a transition between climb, level or descent segments. The triggers Latitude will use to determine if a change in altitude is deliberate or simply a poorly trimmed level flight are:

- **Transition between enroute segments (climb to level to descent) will occur when a flight path changes at a rate greater than +/- 1° sustained for 15 seconds minimum. However, for slow (less than 60 kts) or fast (greater than 300 kts) airplanes, the following limits shall also be applied:**
    - **During a climb or descent segment, if the rate is less than +/- 100 FPM sustained for 15 seconds minimum the segment will change to a level segment.**
    - **During level flight if rate is greater than +/- 500 FPM sustained for 15 seconds min. the segment will change to either a climb or descent segment.**

## IMPORTANT NOTE

It is imperative that climbs and descents are deliberate and contain a level flight segment at least 15 seconds in duration between the segments. If you climb and then immediately begin a sustained descent, with no level segment, the climb and descent will be combined as a singular level segment. Latitude will score this level segment with altitude deviations that occurred while ascending and descending. The same rule applies for descents that transition to a climb segment without a level segment in between. Latitude will combine the descent and climb segments into a level segment and apply deductions associated with the descent and climb altitude changes relative to a level flight path. Two similar segments such as a climb followed by a climb, or descent followed by another descent, is possible if the aircraft wanders off altitude or phase. In these cases, the two similar segments will also be combined for a singular scoring component. **Including a level segment between climb or descent transitions indicates to Latitude that the change in flight path was intentional.**

As noted previously, there is a 5 second 'grace' period where the metrics collected during the 15 second transition waiting period are ignored at the beginning and end of the new enroute segment. This allows for smooth transitions to the selected altitude and smooths out any speed or thrust changes that occur during transition periods. However, this doesn't mean that you linger on your decisions. Make your flight path transitions, deliberately, smoothly and efficiently. If you don't, the flight phase will look sloppy.

While maintaining airspeed, it's important to watch the planes never exceed speed (Vne). Cruise flight sometimes takes place not too far below the never exceed speed. If you begin to over-speed, not only will you receive score deductions for the increased speed deviation but you will begin to compound the deductions when you cross over Vne and approach Vd speed. If you pass the demonstrated dive speed (Vd) your scores will be critically impacted. Beyond Vd speed structural failure can occur at any moment. A duration of 15 seconds at Vd will result in a 100% deduction resulting in a 0% overall score. Going above Vd decreases this duration squared, below to Vne via the root. In short, you have 15 seconds at the aircraft's demonstrated dive speed (Vd) before Latitude assumes the aircraft's structural integrity is lost.

## DESCENTS

Descent segments are scored based on how well a constant **descent rate or path is** maintained. The coordination metric is scored as it is in all segments. Maintaining a constant rate is easy and convenient but in higher performance aircraft with FMS guidance, maintaining a constant path may be required. This will take careful planning because large altitude changes will incur changes in indicated airspeed and wind condition shifts as the aircraft descends from high altitude. The scoring concept is simple: keep your descent path or rate constant but do not mix. For example, let's say you need to descend from FL200 (20,000') and at FL200 your ground speed is 250 knots (200 TAS with 50 knot tailwind). When you pass through 10,000' the ground speed could drop to 200 knots (175 TAS with 25 knot tailwind). If you changed nothing to accommodate the change in ground speed and you maintained only a 2000 FPM vertical speed, your descent path would be an arc, not a straight line. It is fine if you maintain 2000 FPM, but if you switch to 1000 FPM below 10,000 ft., the arc becomes a squiggly line. There are two fundamental ways in achieving a constant flight path.

1) **Establish constant vertical speed and vary ground speed to maintain the same as at top of descent. This may be easier on the shorter descents but may not be possible with strong headwind/tailwind changes encountered on large altitude changes such as from 30,000' to ground. This concept, although yields a constant vertical speed, is not very applicable as you would have a hard time increasing the airspeed to maintain a constant path and still adhere to speed restrictions at lower altitudes.**

2) **The easier, and better, way is to begin descent and vary vertical speed throughout the descent based on your ground speed. A good rule of thumb to follow is: ground speed * 5 (optionally +10%) will equal = 3° flight path.**

However, if you use a constant rate, the same logic used for 'stepped climbs' can be utilized during descents. If you have a long descent, it's a good idea to split the descent into distinct segments by incorporating level segments (minimum 15 seconds) at logical transition points. Utilizing steps during a descent is a good way to accommodate, if needed, changes in the descent rate.

The approach phase is one of the more difficult phases to master but it is one of the most important. Not only does the approach phase lay the foundation for a successful landing but it will also indicate to the pilot if a landing is a 'go or no go'. Remember, flying with Latitude is about adding consequences to your decision making as a pilot. This scenario has happened to all of us at one time. Let's say you're on approach and the VASI (Visual Approach Slope Indicator) is indicating white over white (high) and you are truly too high for a safe stabilized approach and landing. You think to yourself 'Of course I can get the plane down on the runway in one piece without running off the runway'. That's not in question, you probably could. The real question is, could it be done with good stabilized execution and would it be comfortable for the passengers? The answer is likely not. And what about if you don't make the end of the runway?

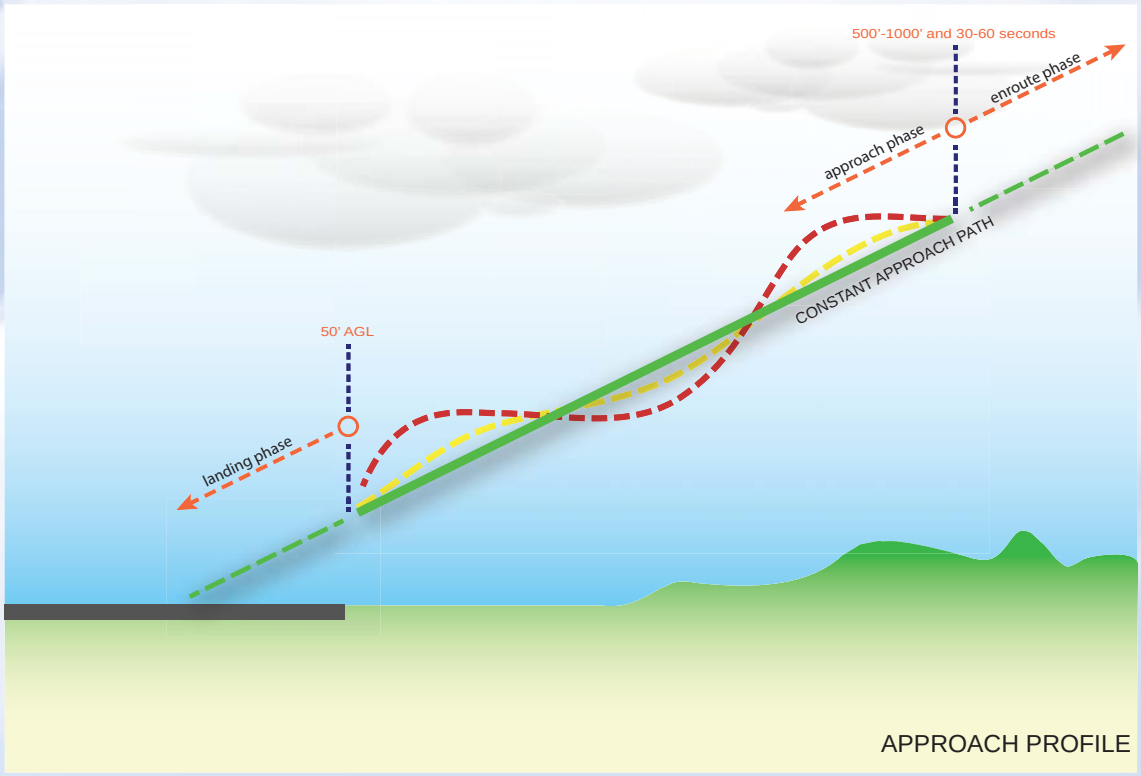
The pilot's decision to continue an approach / landing in the example above, neglecting stable flight paths, touchdown vertical speeds and published landing speeds may not be the safest and would not yield desirable scores. The other option, and often times the best option, is to go around and try the approach again to attain a controlled, stable and safe approach for landing. The option to go around is far superior to smashing the plane into the ground disregarding established safe standards. There are no penalties for going around. Latitude will simply consider your approach as another descent segment to your enroute phase with applicable transitions to level flight and or climb phases tacked on. If in doubt, go around.

The Approach phase begins at predefined altitudes and times prior to touchdown based on a linear interpolation of the aircraft's weight. When both the trigger altitudes and times are met, the enroute phase will end and the approach scoring phase begins. The Approach phase will terminate at 50' (HAT) Height Above Touchdown.

The approach phase trigger altitudes and times are:

| | | |
|---|---|---|
| **Utility** | **(0-12,500 lbs)** | **30-45 seconds & 500-750 AGL** |
| **Commuter** | **(12,500-100,000 lbs)** | **45-60 seconds & 750-1000 AGL** |
| **Transport** | **(100,000+ lbs)** | **60 seconds & 1000 AGL** |

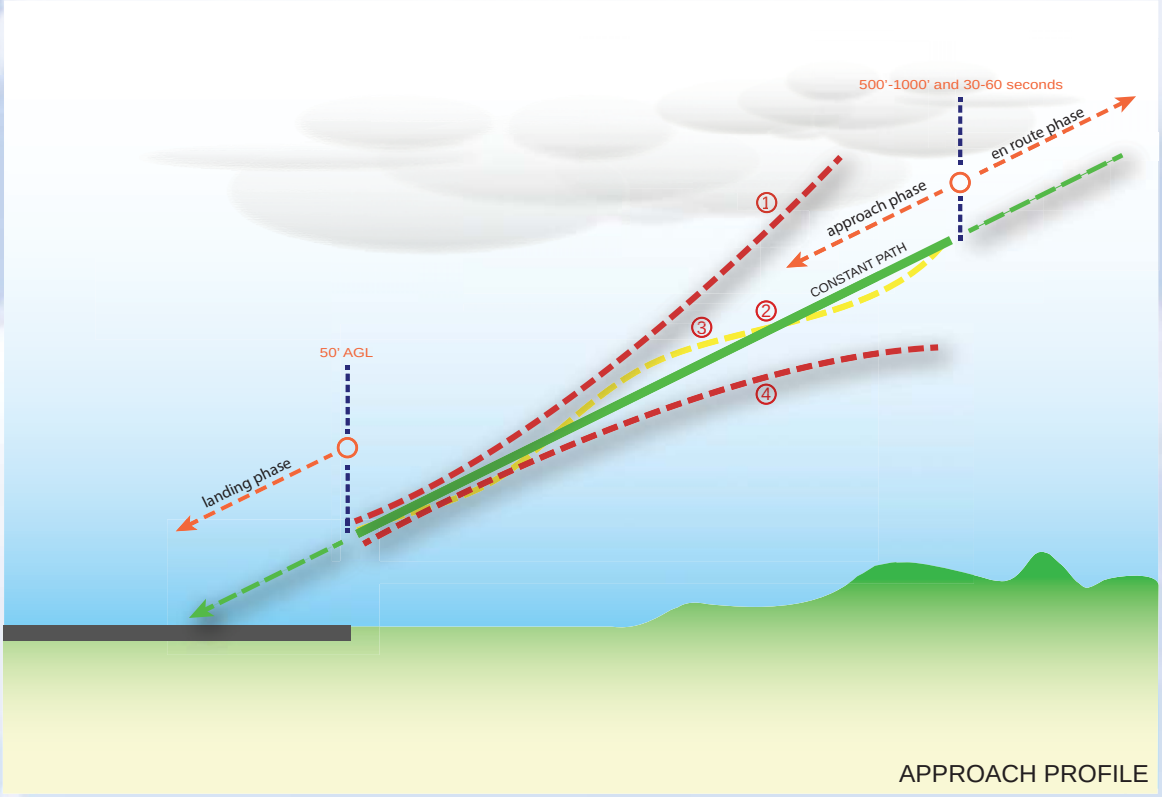
## APPROACH PROFILE




## KEYNOTE LEGEND

| | |
|---|---|
| **Green = Normal** | Constant Path |
| **Yellow = Caution** | Penalties incurred for path deflection either caused by IAS or V/S adjustments. |
| **Red = Warning** | Large score penalties for no constant approach path |

## APPROACH PROFILE




APPROACH PROFILE

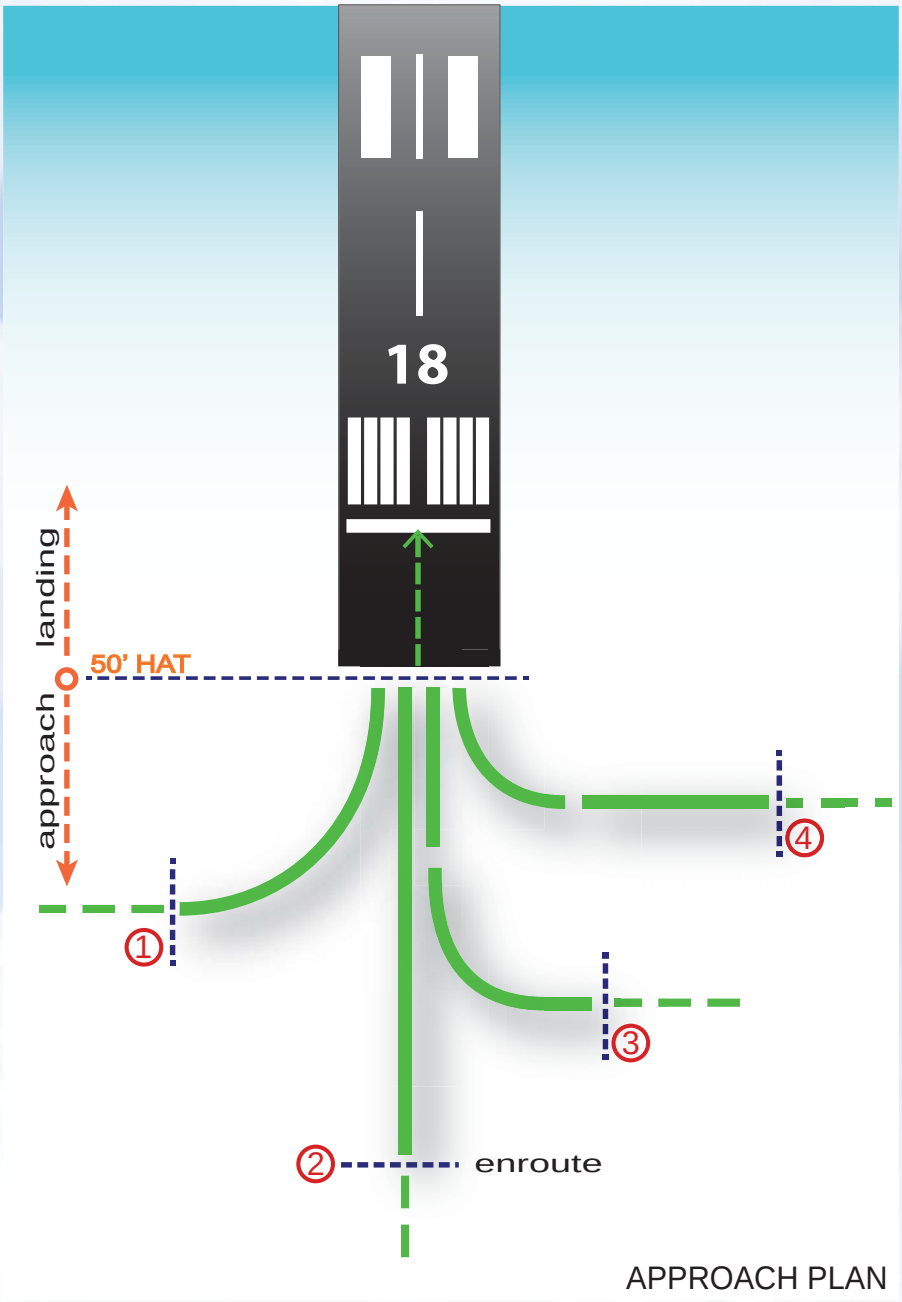
## KEYNOTE LEGEND

**Green = Normal** **2)** Constant Path

**Yellow = Caution** **3)** Penalties incurred for path deflection either caused by IAS or V/S adjustments.

**Red = Warning** **1 & 4)** Larger score penalties for not maintaining a constant path

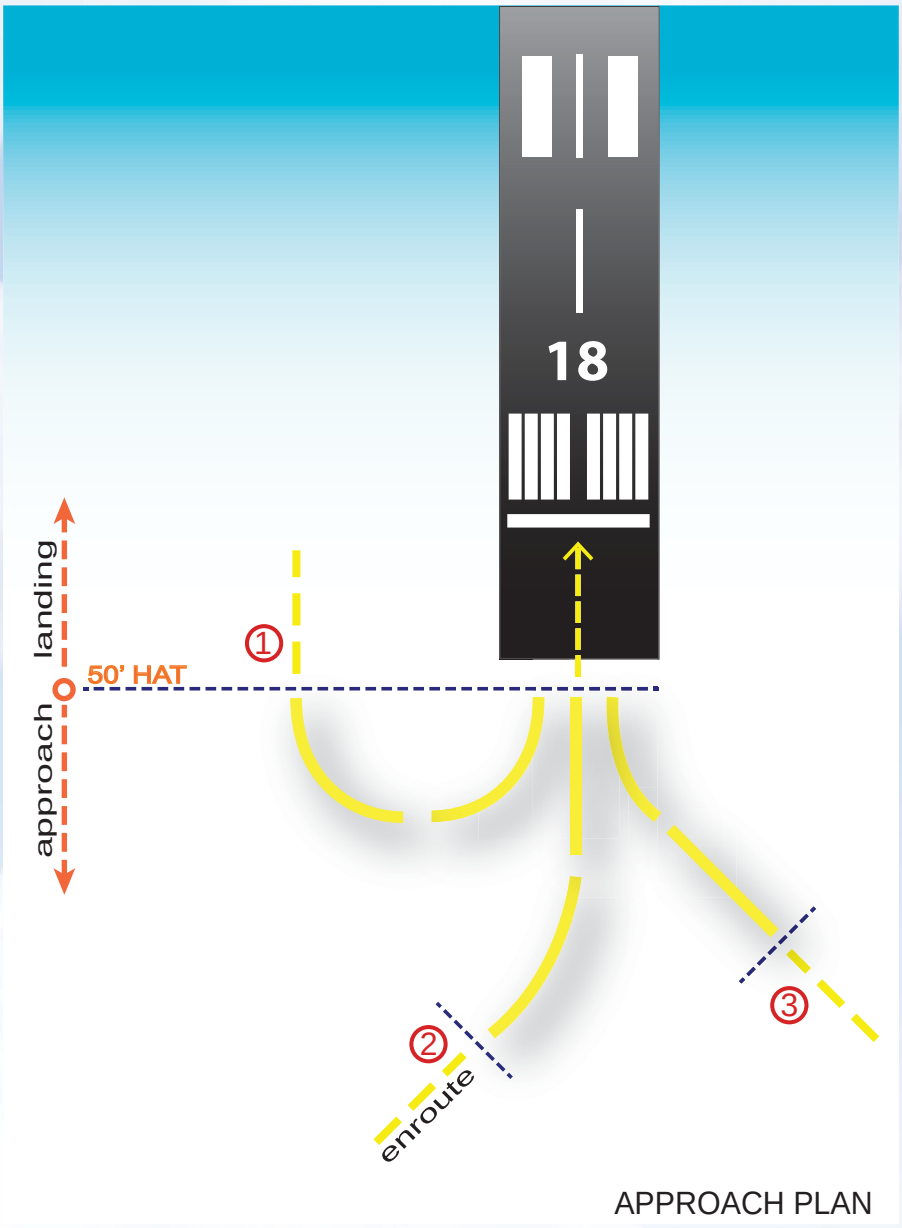
## NORMAL APPROACH TRACKS




### KEYNOTE LEGEND - NORMAL APPROACH TRACKS

**1)** Curved Approach - 90° with no straight final
**2)** Normal Final - Straight
**3)** Short Base to Final - Curved + Straight
**4)** Obstacle Approach - Straight + Curved

## CAUTION APPROACH TRACKS

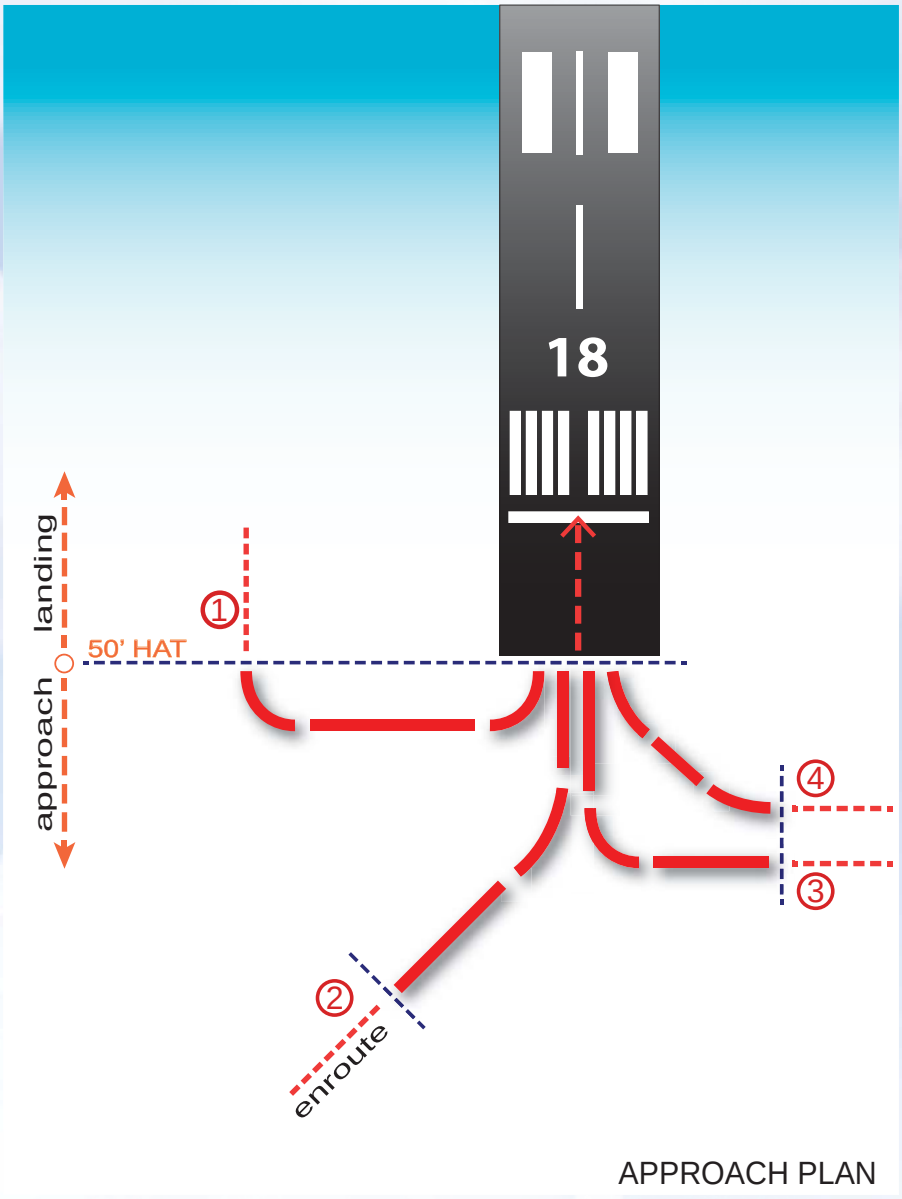



APPROACH PLAN

**KEYNOTE LEGEND - CAUTION APPROACH TRACKS**

**1)** 180° Curve Only – harder to maintain rate of turn.
**2)** 45° Curve + Straight Final – Difficult to gauge final turn. Potential to overshoot.
**3)** Straight + 45° - Difficult to gauge final turn. Potential to overshoot.

## WARNING APPROACH TRACKS




APPROACH PLAN

### KEYNOTE LEGEND - WARNING APPROACH TRACKS

In all of the above cases (1-4), the margin for track error is drastically reduced making a stabilized approach impossible. Latitude will score the track based on a maximum of two segments (curved, straight or both in any order). This means during each segment, the duration measuring the average deviation is very small making it nearly impossible to keep the aircraft track along this average. Plan your approach into the destination carefully and be deliberate with respect to standard conventions of “straight in” or “base to final” approaches.

## APPROACH SCORING

Once the Approach phase has commenced the following metrics are used to assess deductions and generate a resulting phase score.

- **Speed** - The speed metric for this phase is specific to speed variations. The goal is to constantly maintain the published Vref, Vapp or 1.3 Vs1 speed. The more speed deviates, above or below the average, the larger the deduction value to be imposed. The speed deviation metric during this phase is more stringent than during the enroute phase. Although the specific speed doesn't matter, whatever speed you choose during approach should be maintained.

- **Vertical** - The vertical metric during the approach phase is specific to your descent profile. The goal is to maintain a constant descent path (linear, think ILS) by varying the vertical speed as needed to maintain a constant descent slope. The greater the angle deviation along the flight path, the less uniform the descent profile will be during approach.

- **Track** - The track metric for this phase is specific to the track oscillation (the left and right weave) during the approach. The goal is to have the smallest degree of track oscillation relative to the ground path. However, you may need to make a turn during the approach phase. This is acceptable but this metric will measure the turn rate consistency and deviations that occur during the turn. The approach track will be segmented into two measurements (maximum), one segment measuring your deviation along constant rate of turn and the other segment measuring the deviation along the straight path, or vice versa. If you make more than two segments, example, turn, straight, turn - Latitude will score your path based on the two best segments to 50' AGL. It is more difficult to score well with two segments because they are shorter periods of measurements meaning that any deviation will have a higher impact to the average deviation. This concept lends itself to achieving a stabilized approach. The less turns and banks during approach, the better. The point of transition will automatically be determined.

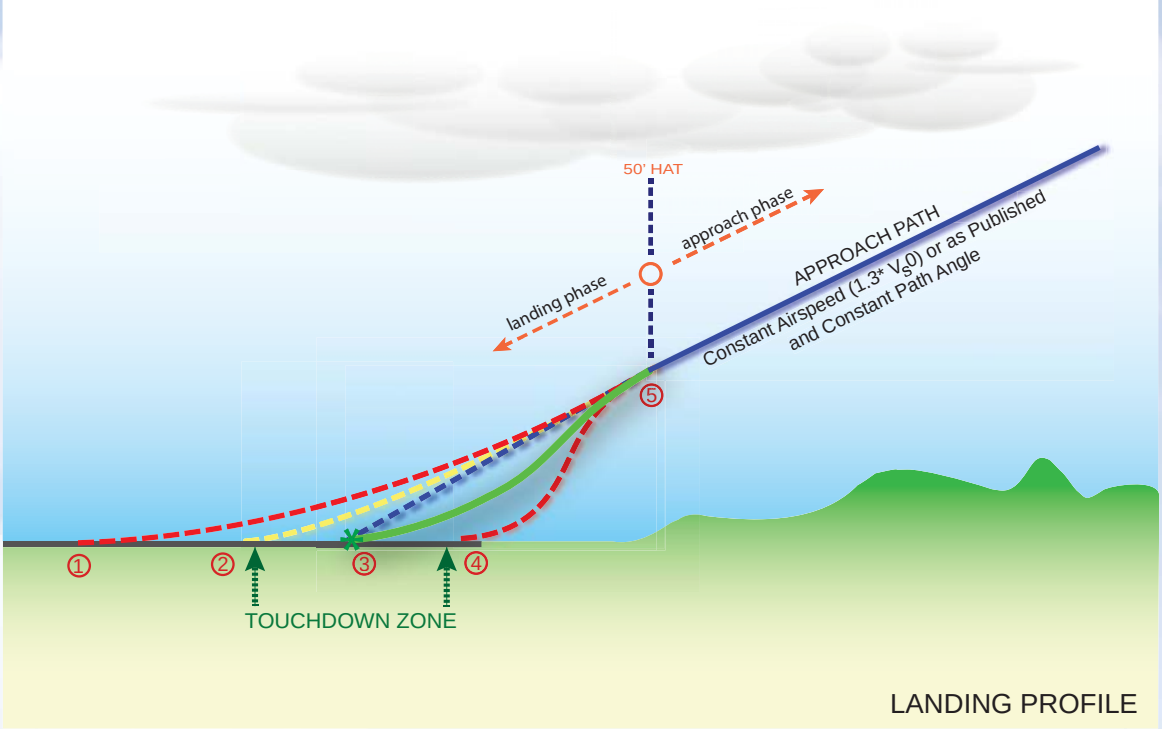
- **Coordination** – The coordination metric for this phase is specific to skidding (movement of the ball on the turn coordinator gauge). The goal is to minimize the amount of track corrections with the rudder during the approach phase. The more rudder inputs the pilot employees, the more the lateral forces applied to the plane thus causing the "ball" to move. Make small rudder corrections to stay coordinated.

The Approach Phase profile should look very much like a constant path descent segment at the end of the enroute phase. If you maintained a constant descent path during the enroute descent segment, the transition to approach should be seamless. If there is a crosswind component to content during the approach, it's preferable to utilize a ''crab'' technique versus a ''slip'' technique. While both are acceptable, it tends to be easier to maintain coordination flying a crab and it's more comfortable for the passengers.

## APPROACH TIPS

- Maintain a constant descent path
- Have a stabilized approach speed
- If making turns during approach, make them constant and uniform

The Landing phase is naturally the most difficult to do well. There are many flight parameters that must be monitored and maintained closely over a relatively short period of time. The Landing phase initiates at 50' HAT and continues until the aircraft decelerates to 15 knots or ¼ (Vs1) – whichever is lower. It is important that you maintain full control of the aircraft until Latitude announces "accept", so no high speed turns or taxi-offs. When "accept" is announced, recording has been terminated and your flight is ready for analytical review. During taxiing, both prior to takeoff and after landing, if you hear "recording" announced, you likely taxied too fast. When you slow down "rejected" will be announced. In this case, no phases have been recorded and there are no penalties.

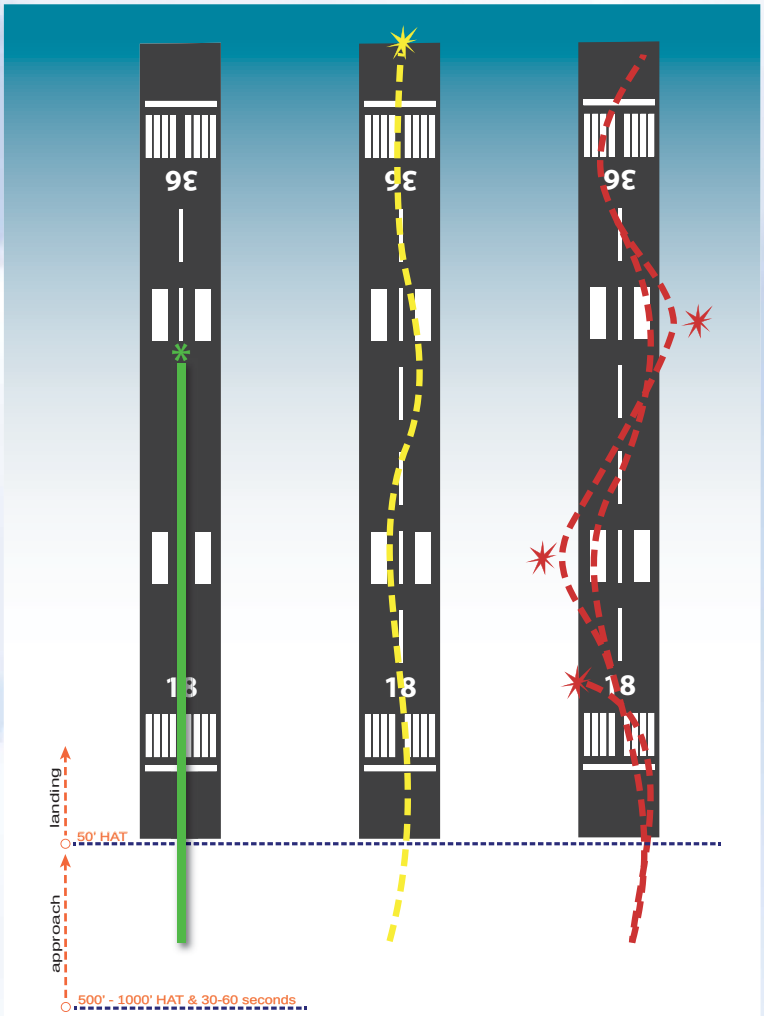



LANDING PROFILE

**KEYNOTE LEGEND**

| | |
|---|---|
| **Green = Good** | Ideal landing point (Item 3). Use the aiming markers located at (Item 3) to touchdown at the ideal landing point. To accommodate flare and associated decreased vertical speed at the point of touchdown, the aircraft should begin to reduce speed from Vref at 50' (HAT) which will increase vertical path. Aircraft should be at 5-10 knots above Vtouchdown at 50' HAT (Below Vapp, around V2 or Vref (Item 5) |
| **Yellow = Caution** | Acceptable landing with minor float (Item 2) |
| **Red = Warning** | Long float (Item 1)<br>Shallow approach or unstable landing (Item 4) |

## LANDING PLAN DIAGRAM




LANDING PLAN

**WARNING:**

Some 3rd party addon airfield sceneries may have different runway surface types and/or locations relative to the default FSX runway locations. Typically this is not a problem since Latitude will begin to note surface deviations if there is a surface change encountered during the touchdown and rollout. If the addon airfield is completely offset from the FSX airfield location and the aircraft remains on the same surface type, no deductions will be encountered. However, in rare cases if the runways (default FSX and addon scenery) are offset from one another but overlap at some location, Latitude may think the aircraft has made a surface change where these runways intersect. If you encounter one of these instances, please notify us on the support forums for further investigation.

## KEYNOTE LEGEND

**Green = Good** Roll-out shall be straight with small rudder deviations to maintain track and coordination until recording has stopped.

**Yellow = Caution** Penalties will be incurred for larger rudder deflections during roll-out. Your coordination will also begin to be penalized due to skidding if rudder deflection is too great.

**Red = Warning** Higher penalties will be assessed for extreme track deflections and poor coordination and skidding during roll-out. Large sweeping tracks that cause runway surface changes will negatively impact scores.

## LANDING SCORING

Once you cross 50’ Height Above Touchdown (HAT), the Landing phase will commence and the following metrics will be used analyzed to assess deductions and generate a resulting phase score.

- **Speed** - The speed metric for this phase is specific to the **Vdn** (touchdown speed) based on aircraft configuration and aircraft landing weight. The goal is to touchdown as close to the predicted Vdn speed as possible. The more your touchdown speed deviates from Vnd, above or below, the larger the scoring deduction. The touchdown speed should be around Vref -5, -10 or based on the stall speed for lighter aircraft. Latitude will announce the predicted touchdown speed just below approach altitude. It assumes the aircraft is configured for landing, so if the aircraft is not configured (full flaps etc.) the announced speed will be incorrect if you make flap changes later. If the touchdown speed predicted by Latitude does not correlate with the touchdown speeds indicated in the aircraft FMS, adjustments can me made to get the speeds in agreement. See the Operations page under the Desktop Client Guide for additional information. The speed metric during landing is more stringent than on approach. However, watching airspeed exclusively will not help the overall landing execution. If you are on speed during approach and on speed during flare, the touchdown speed will be correct. If your touchdown speed is above or below the predicted touchdown speed, you should look at your flight path prior to touching down.

- **Vertical** - The vertical rate metric during the landing phase measures the ‘’delta’’ (absolute difference between vertical speeds) between the vertical speed measured at the point of touchdown over the average vertical speed of the last 50’ prior to touchdown. What is important about this type of measurement is that it will not only measure how smoothly the aircraft touched down on the runway surface but this analysis also reveals if the approach was shallow, steep or if there was any “float” prior to touchdown.

  For example, let’s say you are landing in a Mooney, you’re approach is probably 80+/- knots. If you maintain a 3° degree path the average vertical speed will be around 425 +/- fpm. The average descent rate should not be more than this or less than 25% of the approach path. If the average vertical speed is more, the approach path would be steep. If the average vertical speed is less than a 33% of the approach, your landing flare is long. This is why any type of float matters. If you begin to float due to ground effect or you are flying above the target approach speed, the average descent rate over the preceding 50’ HAT would continue to diminish. When you flare prior to touchdown to lessen the touchdown vertical speed, the average descent rate will continue to decrease. At 50’ HAT, steepen the approach by reducing airspeed as a precursor to a flare. Ultimately the average descent rate over the last 50’ (HAT) should be nearly the same as the approach path because the initial increased descent rate at 50’ HAT and lower descent rate at flare + touchdown average out.

  The maximum touchdown limit before score deductions reach 100% is based on a 6° flight path at 60 knots (638 +/- fpm). As Vref speeds increase for heavier aircraft, the maximum touchdown speeds will begin to level off with a maximum limit around 1000 +/- fpm for large, fast aircraft.

## LANDING SCORING *(continued)*

- **Altitude** - The altitude metric for this phase is specific to any bounce, float or ballooning that may occur during landing. The goal is to be deliberate with your touchdown at the correct IAS and don't bounce, float or balloon.

- **Heading** - The heading metric for this phase is specific to the crosswind alignment at the point of touchdown. The goal is to have the heading aligned with the ground track which should correspond to the runway heading. If you don't correct for crosswind during the point of touchdown, the nose of the plane will be out of alignment with the track. Heading that is not aligned with the ground track at the point of touchdown will result in heading deductions.

- **Track** - The track metric for this phase is specific to the track oscillation (the left and right weave) during the runway roll-out. The goal is to have the smallest degree of track variation from the point you touchdown to the point Latitude announces "accept." Like the take-off roll, small rudder adjustments keep your aircraft on track where as large rudder swings get your aircraft back on track. You want to always be on track, not getting back on track. The larger your total track variation the larger the scoring deduction penalty.

  If you run off the runway, the permissible deviation for track is reduced. The reduction is based on the speed at which you run off the runway. The higher the speed the larger the deduction. Run-offs are detected via surface changes. Multiple surface changes will have multiple track limit reductions. With this in mind, maintain the aircraft's track upon touchdown until you hear Latitude announce the flight has been accepted. **See the warning note about FSX runway surface changes on the landing diagram above.**

- **Coordination** - The coordination metric for this phase is specific to skidding (movement of the ball on the turn coordinator gauge) that occurs both in the air from 50' HAT until recording stops. The goal is to minimize the amount of track corrections during landing roll-out. The more rudder inputs the pilot employs, the more the lateral forces applied to the plane thus causing the "ball" to move. Just prior to touchdown, rudder shall be evenly applied to overcome any crosswind. Upon touchdown, don't get too 'shifty' with the rudder. Apply just enough rudder input to maintain the runway center line. See the warning note about FSX runway surface on the landing diagram above.

## LANDING TIPS

- Maintain a constant descent rate from 50' height above touchdown (HAT) - with decreasing airspeed, then retard
- Adjust aircraft heading as required to accommodate crosswind
- Have a stabilized approach speed
- Touchdown at predicted Vdn IAS
- Flare at landing for lowest possible V/S but don't float
- Apply small rudder inputs to maintain runway heading
- Do not change surface types until recording has stopped

## GENERAL CONCEPTS

- Recording starts at ½ (Vs1), 30 knots or when the plane has become airborne – whichever is less and ends 15 knots or ¼ (VS1)
- Perceptual scoring - not all cr iteria are weighted equally
- Deviation leniency lessens as you climb in career levels. Deviation tolerances range from 15% for student pilots down to 3% for Airline Pilots

## FLYING/SCORING CONCEPTS

### Takeoff

- Phase terminates at 400’ HAL
- Maintain runway center
- Maintain coordination
- Correct heading and track for crosswind
- Throttle up smoothly
- Anticipate and rotate at liftoff speed
- Rotate smoothly
- Use small rudder inputs versus large inputs
- Maximum of 30° degree deviation on liftoff heading from track
- Maximum of 15° degree for track weave
- Don’t hop or sink after liftoff

### Enroute (Climb/Level/Descend)

- Establish climb speed early, and maintain it
- Maintain cruise speed, and level flight precisely
- Descend at a constant vertical rate or path angle
- Plan ahead and make speed changes during descent
- Transitions between climb / descent segments shall include a level segment

### Approach

- Maintain a constant descent path
- Have a stabilized approach speed
- If making turns during approach, make them constant and uniform

### Landing

- Maintain a constant V/S from 50’ HAT - with slightly higher descent rate at 50’ HAT to accommodate flare at landing
- Adjust aircraft heading as required to accommodate crosswind
- Have a stabilized approach speed
- Touchdown at predicted Vdn speed
- Flare at landing for lowest possible descent rate but don’t float
- Apply small rudder inputs to maintain runway heading and constant track
- Do not change surface types until recording has stopped

In conjunction with observing how a pilot has executed a flight, Latitude will also observe metrics associated with gauging the passenger's comfort during the flight. Passenger comfort is important to observe and analyze because there is often direct correlation between passenger comfort and the pilot's skill level. Passenger comfort should not be disregarded as it can provide valuable guidance to the pilot about how they planned and performed during a flight.

Passenger comfort in the real world can be measured by the relative changes in gravitational forces exerted upon the passenger. For example, it's not turbulent air that makes passengers queasy but rather the sudden accelerations and decelerations that grabs the passenger's attention. Normal gravitational forces are what orients us and accelerations tell us when something abnormal is occurring. Flying at night, under IFR conditions or close to terrain may impact our sense of 'comfort' but this may or may not have any direct correlation to the pilot's skill. What matters are the sudden accelerations. Latitude measures the same accelerations that are exerted upon passengers and calculates a comfort score relative to the magnitude of these forces. A comfortable flight for passengers is smooth flight. When accelerations become quick, rather than constant, passengers will notice. The comfort related scoring metrics are recorded at the same time as the skill scoring metrics.

What is critical is that constant accelerations (steady state) matter less for deductions than irregular accelerations (jostling) such as sudden or erratic aircraft movements and speed changes. These types of movements can be caused by poor execution of flight path changes, large swings in vertical speed and weather induced turbulence. With good piloting skills, many of the jostling movements can be mitigated. Good piloting goes hand-in-hand with passenger comfort. Passenger comfort scoring utilizes the same perceptual based scoring and career level based judging criteria as skill scoring. It can be expected from student pilots to have rougher control surface movements and spastic flight paths. However, if you don't exhibit these blunders as a student, your passengers will be impressed. As the scoring criteria increases to Airline Pilot level, passengers will expect a very smooth flight.

It is important to note that your Comfort scores are more than just numbers. If you participate in the Latitude multiplayer environment, passenger comfort directly impacts the revenue your flights will generate. See Part IV: Career, Reputation & Economy Guide for additional information.

During a flight, Latitude will observe acceleration rate metrics in the following directions:

| | |
|---|---|
| **Lateral** | Left/Right Accelerations |
| **Vertical** | Up/Down Accelerations |
| **Longitudinal** | Forward/Backward Accelerations |
| **Coordination** | Yaw (twisting - facing one direction but moving in a different direction) |
| **Ground Contact** | Bouncing down the runway |

**Having a solid understanding of the comfort scoring parameters will allow you to fly, learn and ultimately become a more proficient pilot. Neglecting these metrics will have consequences to your overall comfort score and earnings.**

Latitude does much more than simply critique your flying skills and passenger comfort. It also opens a door to a world filled with others flying for the same reasons you fly. It allows you to build a career, gain a reputation, and earn a living. The Portal is the online portion of Latitude that allows pilot's to experience their flights beyond just a flight by flight analysis. To participate in this online environment (careers, reputation and economy) you only have to do the following:

1) Make Complete flights that include all flight phases - takeoff, enroute, approach and landing
2) Uploaded the flight to the **Portal** using the Latitude Desktop Client

If you don't complete either of these tasks, there will not be career, reputation or economic components to your simming environment – just the analytical scoring. There are no requirements to participate in the Latitude online environment but it is a fun and exciting way to experience aviation aspects found in the real-world. If you choose not to upload your completed flights to the Portal, you can still have an objective analysis of your flight. It is at the pilot's discretion to determine which completed flights are uploaded to the Portal. However, the less flights you upload, the slower your growth will be within the multiplayer career, reputation and economy ranks.

The following ***Portal*** components will be discussed below. Each flight uploaded to the Portal will have implications relating to your:

**Career Level**
**Experience and Reputation**
**Pilot Earnings**

## CAREER LEVELS

Career levels are loosely based around real world certifications, just like the flight scoring criteria. Flights at a pilot's current online career level are scored at the same scoring criteria level. This means that if you have a Student Pilot career level, your flights are scored using Student Pilot criteria. Beyond scoring, your career level will impact the economic and reputation computations. You career level will also rank your pilot skills and comfort skills amongst the ranks of pilots at the same career level in the portal environment. How your Career Level changes the economics within Latitude will be discussed under the Economy section in the proceeding sections. For now, let's discuss the Career Levels and what it will take to propel you up the career ladder.

All careers start at the Student Pilot level. From that point forward, each flight that is uploaded to the portal will have an impact on your career. If you string together enough flights above a certain scoring criteria at your current career level and spend enough time in the cockpit, you will be promoted. Consequently, score poorly on a string of flights and you will be demoted. The Career ladder is based on more than just scores. You must also complete a minimum number of flights and spend a predetermined minimum amount of time in the pilot's seat before you are promoted.

## PROMOTIONS

As flights are uploaded to the portal (flight that are not marked as "do not upload") the flight becomes part of a "rolling average" of flights until you achieve all the career advancement requirements. Once you have achieved all of the minimum requirements to advance to the next level, you will be promoted automatically. At that time, scoring becomes more difficult and planes become cheaper to operate.

**Student Pilot**

- Everyone starts here and the instructor (Latitude) won't quit until you do

**Student to Sport Pilot**

- 10 Total Hours
- 10 Total Flights
- 50% average **skill** over last 5 flights and 5.0 hours
- 50% average **comfort** last 5 flights and 5.0 hours

**Sport Pilot to Private Pilot**

- 30 Total Hours
- 30 Total Flights
- 50% average **skill** over last 15 flights and 15 hours
- 50% average **comfort** last 15 flights and 15 hours

**Private Pilot to Commercial Pilot**

- 60 Total Hours
- 60 Total Flights
- 50% average **skill** over last 30 flights and 30 hours
- 50% average **comfort** last 30 flights and 30 hours

**Commercial Pilot to Airline Pilot**

- 100 Total Hours
- 100 Total Flights
- 50% average **skill** over last 50 flights and 50 hours
- 50% average **comfort** last 50 flights and 50 hours

**Airline Pilot**

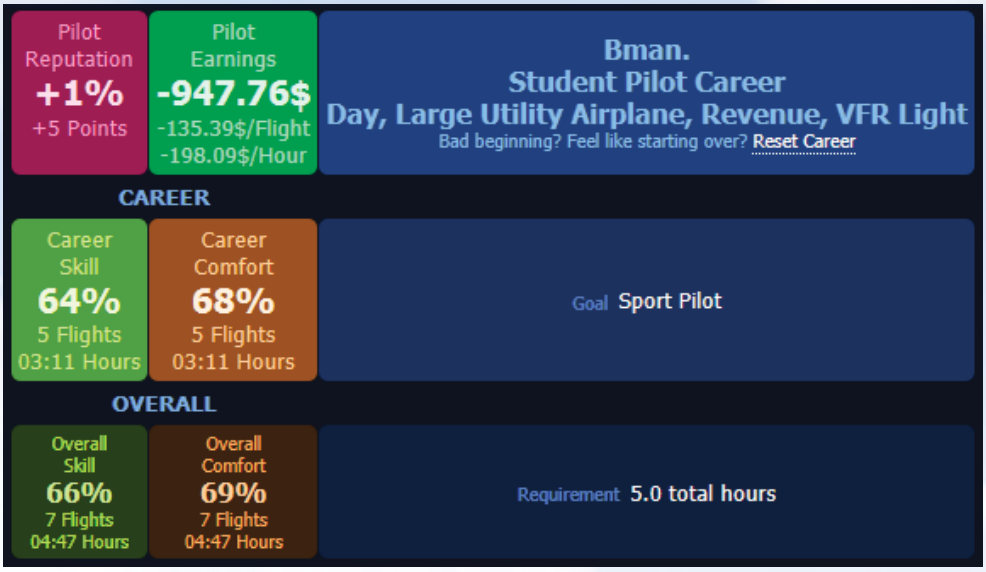
- Congratulations – your focus and dedication has paid off but flying won't get easy!

It's important to understand that all of the criteria have to be met before a promotion occurs. For example, if the requirement to achieve Sport Pilot Level is 10 total flight and 10 total hours, it might take you 20 flights to achieve the minimum time required for advancement because you might fly only short flights. You are also required to have a minimum average for Skill and Comfort scores over the past 5 flights and 5 hours – whichever is longer. This means that more than 5 flights might be used to determine this average. If you have an average of 65% on the last 10 flights but they were all "Patterns" (10 minutes or so) you will still be short of the requirement because the 10 flights at 10 minutes each is only 1 hour and 40 minutes. Latitude will continue adding flights to this "rolling average" until both condition are met – encompassing 5 hours AND 5 flights. Conversely you might have a single 5 hour cross country flight that is awarded a 75% skill and comfort score but you would be short of the required minimum of 10 flights. Because of these requirements, you may see more flights or more hours included in your career average, but not less. If you always complete 1 hour flights then your "rolling average" would always match the requirement verbiage.

**PROMOTIONS** *(continued)*

One more example – let's say you have 5 flights with a rolling average of 55% and just shy of the minimum 5 hour average above 50% requirement. You are close to career advancement but completely tank the scores on the next flight – you have a choice whether to upload the flight or not. If you choose to not uploading the flight, you lose any potential revenue or reputation generated during the flight. If you do upload the flight, your average may drop below 50%. Although the required 5 hours of flight time is met, you won't advance to the Sport Pilot until you have another flight, or flights, that elevate your career average above back above 50% for the past 5 hours of logged flights.

Let's look at the example below to pull together the advancement logic. This pilot has met the requirement of 50% over 3.0 hours for both skill and comfort rolling average but this pilot is still short of the 5.0 total hours required for advancement. Assuming this pilot's next flight is longer than 13 minutes and his scores don't cause the average to drop below 50%, they are on their way up to Sport Pilot.
The Career score average and number of flights go back in the logbook as far as needed to meet the advancement requirements. This is why you see only 5 flights under the Career heading below. From the most recent flight and looking back 5 flights, the pilot attained at least 3 hours AND greater than 50% averages for both skill and comfort scores.



### DEMOTIONS

As you can see, climbing the career ladder isn't just about completing flights, it's about complete them and scoring well enough to advance. What makes it fun and dynamic, is that if you continually have sub-par scores in either comfort or skill, you can potentially be demoted. If at any given time your score averages do not meet the previous career level requirements you will be demoted. By its shear nature, this can only happen as a result of skill or comfort scores since you will never "lose" flights or hours. How this happens is simple – once you have completed a flight your new rolling average scores are analyzed to make sure that you have maintained a minimum average that was initially required for promotion. This can happen in cases where you have a long string of bad scoring flights that cause your career average at any lower career scoring criteria to drop below 50%. Latitude does all of this automatically behind the scenes. If you start hovering around 50% for a while, it's time to pick up the pace to avoid a demotion. This scenario can also happen if you advance to the next career level on a very thin margin and the immediate following flights are well below 50%. Don't worry however, if you happen to be demoted, a few solid flights above 50% will put you back on your career track. When you are demoted, the full gamut of advancement requirements are not reset – only your average is what needs to be brought back up above the minimum advancement threshold.

Because the way the flights are re-analyzed to assure you are maintaining previous advancement requirements, means that you can potentially be demoted more than one career level. It's unlikely, but the potential exists if the uploaded flights are poor enough and you bulk upload more than one flight.

It is also important to note that once you advance in career levels, all of your flights are re-scored based on your current career level. What this assures is that every pilot on a particular career level has a level playing field while comparing overall and career score averages. If the rolling average scores were not re-run at the current career level scoring criteria, pilots that recently advanced to the next career level would sit atop the leader board. All the while, all of the other pilots that have been at that same career level for a long time, have had their flights judged on more stringent scoring criteria.

While the ultimate goal is to achieve the highest career rank possible; it is the journey from Student Pilot to Airline Pilot that is important - the learning experience. There will always be pilots better than you and also worse than you – just keep in mind it's about the journey and having a lot of fun while you (hopefully) learn and improve your flying abilities.

## EXPERIENCE POINTS & REPUTATION

Each pilot receives positive or negative ***Experience*** Points based on individual scoring metrics and the degree of metric deductions. Over time the experience points will represent the pilot's flying consistency and contribute to the profitability.

## EXPERIENCE

Latitude scores range from 100%-0%. However, experience points don't have a floor limit when it comes to scoring your flight. What "experience" cares about is ***how*** you achieved your score. You may receive a 0% on landing, but how you achieved it matters. Take three flights for example. On flight A, you received 4 deductions of -25% each. On flight B, you received two deductions at -50% each, and on flight C you received one -100% deduction. With all else being equal, the landing score for all three flights is 0%, but flight A would receive the most (or least amount of negative) experience points, followed by B and C. If we then look at another flight, D, where you received deductions -100, -50, -25, the landing is score would still be 0, but flight would have a much worse experience results than all the other example flights (A-C).

Your experience points will reflect how bad something really was. So when comparing similar flights of similar scores, it's a good idea to look at the experience point as a tie breaker.

Experience points are based only on metric deductions. This includes all metrics and without limiting deductions (greater than -100% deduction). It doesn't matter if they are skill or comfort. The rules are easy:

**All deductions above 25% = Positive Experience Points**

**All deductions below 25% = Negative Experience Points**

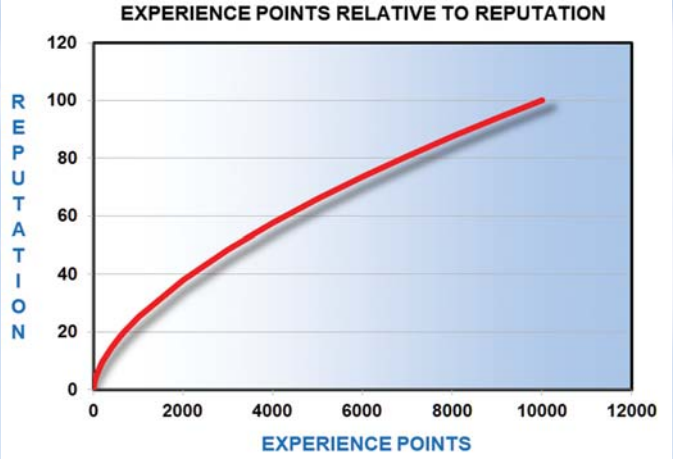
For example, you may have a 50% overall flight score but still receive negative experience points if you had one segment that was really bad – at or below the 0% score limit. In this example, you may have made a good takeoff and enroute segment, an average approach but a poor landing with deductions beyond 0%. Your total flight score may be 50% but if your experience points are negative, this indicates that you had poorly executed segments during your flight. You might be great at takeoffs but horrible at landings. This is what experience points reflects.

At lower career levels, scores will yield less experience points than the same score at higher career levels. This reflects the increased scoring difficulty as you advance the up the career ladder. Since it is harder to achieve good scores under Airline pilot scoring criteria, it will be easier to earn a good reputation if you achieve good scores.

## REPUTATION

Experience points are translated into a pilot's Reputation based on a logarithmic type scale (see graphic below) and has no minimum or maximum limit. The Reputation reflects how consistent the pilot is conducting flights. A good reputation reflects a pilot that flies consistently and who is well-rounded in all flight phases. A bad reputation reflects a pilot who is not consistent and continually making large mistakes in spite of average overall scores.

To achieve a perfect reputation of 100%, a pilot will need 10,000 experience points. If a pilot has a reputation of 100% or higher, flights they conducted will never lose money until their reputation drops below 100%.




To allow for pilot-to-pilot Reputation comparison across the Career ladder, experience points are halved when pilot's advance career levels and halved when pilot's are demoted. This puts everyone on the same playing field when comparing reputations between pilots. If the experience points were not adjusted, when career levels are changed, a student pilot might think he has a stronger reputation than a Private level pilot. However, the Private Pilot had more stringent deduction criteria during his flights. Adjusting the experience points during career advancement or demotion allows for pilot's to truly compare their reputation amongst the career classification.

Reputation not only provides a pilot with bragging rights but reputation also adds to the pilots earnings potential on every flight. See the Economy section below to understand how a pilot's reputation generates both bonuses and penalties to flight earnings.

## ECONOMY

As the Latitude tag line suggests "Flying with Consequence," forethought must be given to all aspects of a flight prior to rolling down the runway. The Latitude economy encompasses everything from route planning, type of flight conducted, payload configuration, weather conditions encountered during flight, piloting skill, passenger comfort and pilot reputation. All of these components play an important economic role. Neglecting any of these parameters will result in diminished profitability opportunities.

Each pilot has their own total career ***Earnings*** and each pilot has the ability to compete amongst their fellow pilots in generating the most profits. The only prerequisites to participating in the Latitude Economy are:

1) Make complete flights that include all flight phases - takeoff, enroute, approach and landing
2) Flights are uploaded to the **Portal**

If you don't complete either of these tasks, there will be no economic component to your simming environment. There is no requirement to participate in the Latitude economy but it is a fun and exciting way to enjoy aspects found in real world aviation. Your financial earnings are also a good barometer of your all around flight planning and flying proficiency. If you choose not to upload your completed flights to the Portal, you will not enjoy the Latitude economic environment but can still have an objective analysis of your flight.

In the simplest terms, if you plan the most direct routes possible, take the most payload allowable within aircraft and airport limitations, and fly with skill and proficiency – you will become profitable. The simple equation is:

***Revenue – Expenses + Bonuses = Earnings (Profits or Loses)***

There are many factors that drive you're revenue, expenses and bonuses. Outlined below are the criteria that determine the potential to make a pile of cash or fall deep into debt. Each of these factors must be considered as you begin the planning stages of each flight. The primary factors include:

**Plan Route** - Pattern, Ferry or Charter

**Income**

**Payload –** Plane Weight / Payload Transported / Distance Transported

**Revenue** – ($/lbs/per nautical mile) Transport distance of payload * pricing. Pricing is based on MTOW and distance flown modified by the **Comfort** score

**Expenses**

**Fuel Costs** - Fuel burned & Minimum Reserves & Flying Efficiency

**Operational Costs** - Maintenance costs (MTOW modified by Skill Score)

**Fixed Costs** - Insurance, storage and administrative costs (Based on Career Level)

**Bonuses/Penalties** - Reputation Based

## PLAN ROUTES

Not all flights are conducted for the same reasons. Some pilots, student pilots for example, may want to sharpen their skills by continually flying patterns around the same airfield. The economics centered around **Pattern Flight** is not the same as a **Charter** based flights carrying payload 500 nm away. Nor are the economics the same for **Ferry Flights.** Fuel costs and Fixed costs are impacted by the type of flight conducted. Latitude will base your fuel and fixed costs based on how much payload you transport and how far the plane flew beyond a point to point distance from the departure airfield. When the following conditions are met, the impacts to your flight earnings will be applied:

**Pattern:**

**Requirements:**
If takeoff & landing are within **3 nm** of each other

**Impacts:**
**No fixed costs imposed**
**Fuel is $1.00 per pound**
**No Revenue generated**

This represents reduced insurance, or flight training. Since there likely aren't paying passengers during pattern work, there is no revenue generated.

**Ferry:**

**Requirements:**
If **Payload Weight** is less than the **Exclusion Weight**

**Impacts:**
**No fixed costs imposed**
**Fuel will follow standard fuel expense rate (Fuel Burned +/- Reserves)**

Under Ferry flight rules, the pilot must still be aware of the 1 hour reserve requirement but there are no fixed cost expenses because there is no "revenue for hire" aspect with a non-commercial flight.

**Charter:**

**Requirements:**
If takeoff & landing are greater than 3 nm apart from each other
If **Payload Weight** is more than the **Exclusion Weight (crew, equipment)**

**Impacts:**
**Fixed costs are imposed**
**Operational costs are imposed**
**Fuel will follow standard fuel expense rate (Fuel Burned +/- Reserves)**

Under Charter flight rules, the pilot must be aware of the 1 hour reserve requirement and both operational and fixed cost expenses because the flight is "revenue for hire". These flights are considered commercial "for hire" flights.

The Plan Route system is in place as to not financially penalize Student Pilots or Ferry Pilot for practicing or not carrying any payload. With that being said, don't hesitate to hit the airfield and practice touch and go's or patterns until you can't stand it any longer. Financially it won't cost your Pilot Earnings very much and it will be beneficial if you gain reputation.

### PAYLOAD

The amount of payload you carry, the distance you take it, and how well you transport the payload is the basis for revenue income generated. The goal is to take as much payload as your plane, route, departure and arrival airports will allow. Flying an empty plane is an expensive proposition as there are a lot of expenses to be paid. If no one is onboard to offset these expenses you will be stuck with the bill.

Payload revenue is earned at a given price per/lb per nautical mile flown relative to the maximum takeoff weight (MTOW) of the aircraft. The total payload transported generating revenue excludes any weights that are not part of the paying customer base. See the **Exclusions** section below. The pay rate for transported payload weight varies on a 'curve' relative to the aircraft's MTOW. This curved pay scale allows for the *possibility* of positive earnings for all aircraft types. This curve also limits extreme positive and negative revenue earnings for larger aircraft. The relative pay rate to MTOW can be generally expressed by the following ratios:

| MTOW | RELATIVE PAY RATE |
|---|---|
| 1000 lbs | 150% |
| 3125 lbs | 125% |
| 6250 lbs | 110% |
| 12500 lbs | 98% |
| 25000 lbs | 87% |
| 50000 lbs | 79% |
| 100000 lbs | 75% |
| 250000 lbs | 77% |
| 500000 lbs | 88% |
| 1000000 lbs | 112.50% |

These ratios may be adjusted in the future if it is determined revenue is disproportionate relative to other aircraft classes / weights.

As is it in the real world aviation economy, the longer the trip in nautical miles and larger the plane, the less the revenue generated. Of course airfare prices range greatly in the real world but in general the longer the route the more significant the diminishing of returns for the airline and smaller profit margins.

## IMPORTANT:

The revenue ***pay rate*** (LBS/NM) is based on the total distance flown but the actual multiplier used to calculate your ***generated income*** per LB/NM is paid on a point to point distance (airport-to-airport). This represents passenger's unhappiness with delays, layovers, go-arounds or longer than expected flight durations. This also eliminates the potential for pilots to arrive at the destination and make 100 laps around the pattern to generate additional revenue. If you don't have a direct flight, not only are you getting paid less per nautical mile flown, you are also spending more in fuel expenses. Remember, efficient flight planning is in the interest of a profitable route. If you aren't efficient with your planning, you will have to make up the financial difference, not the passengers. Just as airlines are unhappy by ATC delays/ vectors, and ask for shortcuts, so should you!

### PAYLOAD EXCLUSIONS

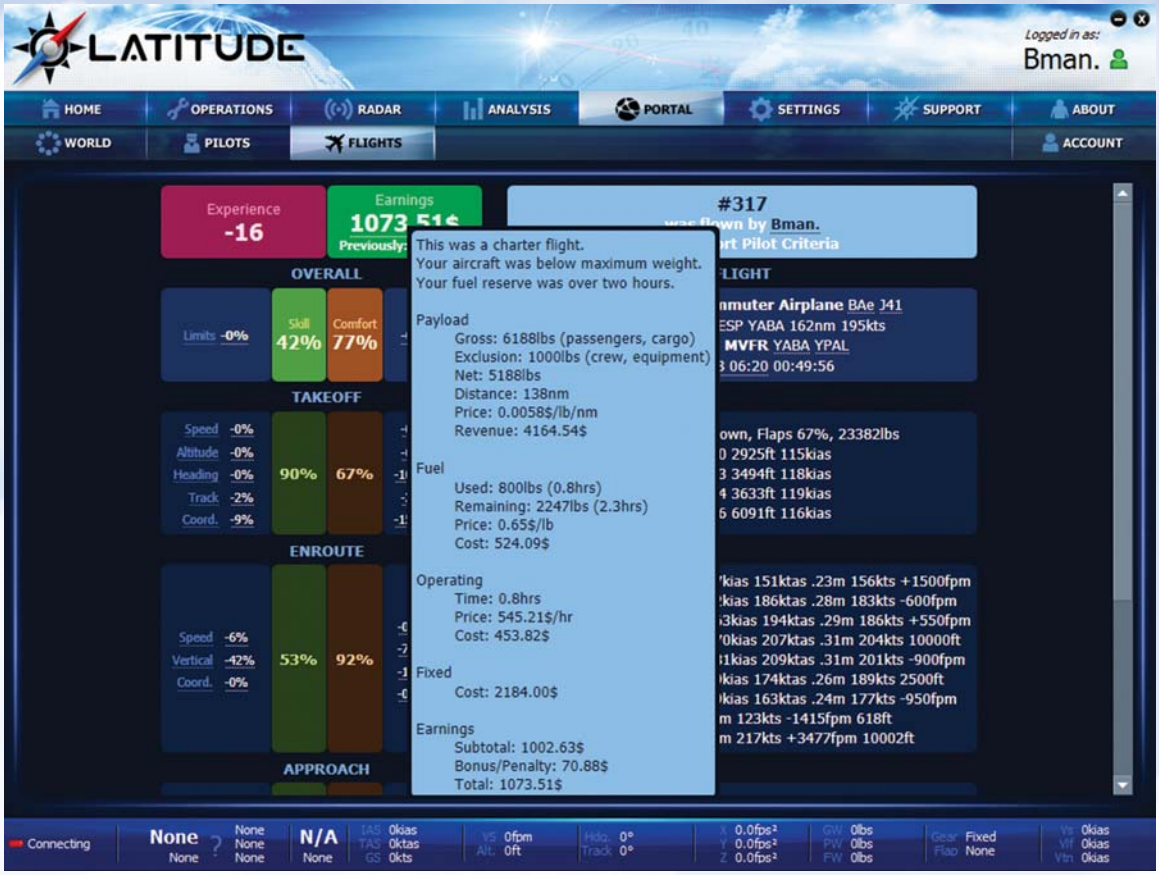
The total payload transported generating revenue excludes any weights that are not part of the paying customer base. These exclusions represent payload that is not earning revenue, such as the flight crew and flight crew gear. Exclusions are automatically calculated based on the MTOW of the plane. It is important to note than any plane that departs over MTOW, maximum passenger weight (MPW), maximum fuel weight (MFW), or lands over the maximum landing weight (MLW) will have the overage weights added to the exclusion weight totals. Takeoff weight that exceeds MTOW, is a squared and then included in the exclusions. This can have a significant impact on the total revenue generating payload totals. Pay careful attention during loading and verify your are departing below MTOW.

### APPROXIMATE EXCLUSION WEIGHT REFERENCE TABLE:

| MTOW | EXCLUSION WEIGHT |
|---|---|
| 3125 lbs | 250 lbs |
| 6250 lbs | 500 lbs |
| 12500 lbs | 750 lbs |
| 25000 lbs | 1000 lbs |
| 50000 lbs | 1250 lbs |
| 100000 lbs | 1500 lbs |
| 250000 lbs | 1750 lbs |
| 500000 lbs | 2000 lbs |

## REVENUE

Payload weight minus exclusion weight and how far it was transported is the basis of positive earnings potential. However, just because the passengers reached their destination does not guarantee a flight that generates a lot of income revenue. The passenger comfort score is critical to generating as much revenue as possible. If the passengers were comfortable during a flight, they will pay the maximum ticket price. Conversely, if their comfort was sacrificed on account of poor piloting skills, they are going to pay less for the flight. Passenger comfort is a direct multiplier of the potential revenue. As passenger comfort scores incur deductions, the effective revenue will decrease. See the example below:




Clicking on the Earnings value found under each selected flight on the portal will display details of the flight earnings. What is critical to note is that the price paid per/lb/nm is multiplied by Comfort score/87.5%. In this flight the revenue rate os 88% of what the revenue rate could have been if the pilot had scored a 87.5% (a near perfect flight) on the overall comfort score. Although a perfect score will be tough to achieve, you don't want to neglect the passenger's comfort. If the pilot had scored an overall comfort score of 20%, nearly all of the revenue would have been lost on this flight and would have resulted in a flight that ultimately lost money.

| | |
|---|---|
| Pay rate LB/NM | $.0058 lb/nm (based on 77% comfort score) |
| Paying Payload | 5188 lbs (weight - exclusions) |
| Most Direct Route | 138 nm (Point to Point – what you are paid for) |

**Calculation : (.0058 * 5188 lbs * 138 nm) = $4152.47**

Note: The reason for the slight variance from the indicated $4164.54 is due to rounding of values as depicted on the scoring pop-up as the true comfort score and distance flown may have been slightly different.

## EXPENSES

Your passengers have now purchased their tickets arrived at their destination and now it's time to pay for all of the expenses associated with a flying a plane. The expenses can be quite elevated. In fact, some planes are built around comfort, convenience and luxury not necessarily based around efficiency. Some of the expenses associated with flying a plane include:

**Fuel Costs:** Based on fuel burned +/- 1.0 hour reserve fuel
**Operational Costs**: Aircraft maintenance, employee salaries based on skill score
**Fixed Costs**: Insurance and storage costs based on career level

## FUEL COSTS

Fuel costs are one of the largest expenditures encountered during your quest in making your flights profitable. The first step towards becoming profitable starts on the ground during your flight planning exercises. If a route is not planned efficiently, like taking a roundabout way of reaching the final destination, you can expect to pay for it with increased fuel burn and operating time costs. The fuel expense calculations are based on a nominal value:

**All fuel starts off at $1.00 per lb**

However, the $1.00 rate only exists when you have exactly 1.0 hour of reserves upon landing. If the price is less than $1.00 this means that you took more fuel than needed and that surplus fuel would have cost you less at your home base. However, if your fuel cost is greater than $1.00, this means that you have landed with less than the required 1.0 hour of fuel reserves. It is important to note that the fuel cost rate grows exponentially as you go below the 1.0 hour reserve requirement. This additional fuel cost rate represents a myriad of things that could go wrong during a flight – for example, emergencies, regulatory fines or any other "bad" things that can occur when planning is not done well and thoroughly. The fuel cost table below shows the fuel costs above and below the 1.0 hour reserve requirement. Your will never pay more in fuel expenses than the MTOW of the aircraft.

## FUEL COST TABLE:

15min: Up to $16
30min: Up to $4
45min: Up to $1.78
60min/1hour: $1/lb
1.5 hours: $0.82/lb
2 hours: $0.71/lb
3 hours: $0.58/lb

**FUEL COSTS** *(continued)*

It is important to plan according to how you plan to fly the plane in terms of efficiency during cruise. Flying fast for time consideration or slow and leisurely, the winds aloft conditions, and temperature above or below ISA all impact the planes efficiently the effective fuel burn. Planning carefully will assure that you land with 1.0 fuel reserves. Carrying more fuel than planned is like hedging a bet or tanking cheap fuel. During the aircraft loading stages, if you reach the maximum passenger weight (MPW), taking extra fuel is a good alternative than flying below MTOW. This is assuming you don't go over predicted maximum landing weight (MLW). This will lessen your fuel expenses since you will land with more than 1.0 fuel reserves.

The published book values for specific aircraft hourly fuel burn may not be in fact the way you are flying the plane. If you depart from the optimal flying parameters of an aircraft, the true fuel burn may be significantly higher or lower than the published values. Keep this in mind when you are trying to pin down your anticipated fuel levels at touchdown.

Keep in mind while planning your route and expected fuel burn, every pound you take in fuel is one less pound you can take for revenue generating payload. Ideally you would not carry extraneous fuel weight but rather carry more payload and land precisely with 1.0 hour of reserves. It's a balancing act between fuel & payload – with practice you will plan and fly with better efficiency.

**IMPORTANT:**

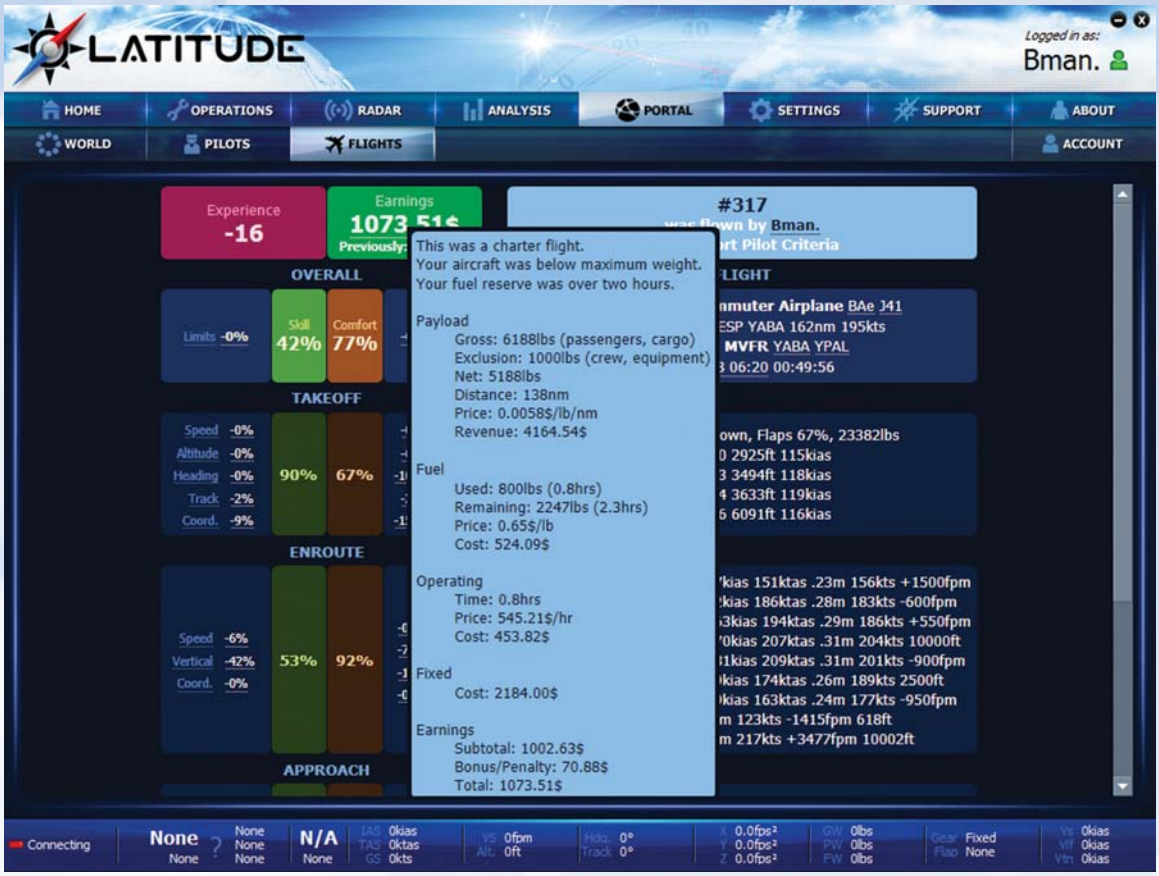
Carrying more fuel than planned is like hedging a bet or tanking cheap fuel. During the aircraft loading stages, if you reach the maximum passenger weight (MPW), taking extra fuel is a good alternative than flying below MTOW. This is assuming you don't go over predicted maximum landing weight (MLW). This will lessen your fuel expenses since you will land with more than 1.0 fuel reserves.

**IMPORTANT:**

Published book values for specific aircraft hourly fuel burn may not be in fact the way you are flying the plane. If you depart from the optimal flying parameters of an aircraft, the true fuel burn may be significantly higher or lower than the published values. Keep this in mind when you are trying to pin down your anticipated fuel levels at touchdown.

**FUEL COSTS** *(continued)*

Latitude calculates your average fuel burn based on what the average fuel burn per hour was over the duration of a flight. For example, during a climb segment your rate will be higher lbs / hour than during descent. The average fuel burn/hour is what Latitude will consider when determining how many pounds of fuel equals 1.0 hour reserve. The calculation is simple:




| | |
|---|---|
| Total Fuel Weight Used: | 800 lbs |
| Total Flight Time: | 49:56 |
| Fuel Rate: | 800 lbs / .8 hours = **1000 lbs/hour** |

Based on this example, carried more fuel than required to land above the 1.0 hour reserve requirement. This resulted in cheaper fuel costs.

**FUEL COSTS** *(continued)*

Although the fuel burn rate is a specific value used in calculating your fuel costs, Latitude only cares about the actual fuel used. What is important is that you can tell if you fuel burn is higher/lower than expected compared to the manufacturer's fuel burn specifications. If the fuel flow rate is higher than published, you may be encountering conditions that have not been accurately planned for like head/tail winds and higher cruise speeds. In the example above, the fuel burn was around 634.95/(6.7 pounds per gallon Jet-A fuel) = 94.67 lbs/hr. Cessna Mustang has a published fuel burn between 70-90 pounds per hour so this means the plane was flown above its optimal efficiency conditions with regards to cruise speeds and altitudes. The pilot took enough fuel to cover emergency reserves, however, the pilot also spent more money flying faster and lower than he would have if the plane was flown at the maximum efficiency. This ultimately impacted the bottom line profit margin.

The key takeaway from this is – **know your plane**. Know how much fuel you should expect to burn and execute accordingly. If you aren't in a big hurry to reach your destination, cruise at a lower speed. If you have a long flight, climb to the optimal cruise altitude for the specific plane. Every plane has a "sweet spot." If you want to save on fuel costs, find the sweet spot and fly as close to it as possible.

In general almost all planes can generate enough revenue to offset the fuel expenses. However, there are a handful of planes that are inherently bad at making money – just like in the real world. Take for example the Cessna Mustang, it's a great plane. It's fast, sleek and fun to fly. However, the payload carrying capacity relative to the engine efficiency lends itself to being more convenient than profit generating.

Looking at both ends of the aircraft spectrum, there are chances to both make and lose money in the different aircraft classes. There is a risk / reward associated with all planes. For example, if you fly a Cessna 172 you can make a few hundred bucks if you have flown well, passenger comfort is high and you have taken the payload a long enough distance. If the 172 flight ends up disastrous you can lose a couple of thousand after all expensed are paid. On the other end of the aircraft spectrum such as a Boeing 747, you have the potential to make tens of thousands of dollars but you can also lose millions if planning, loading and flying are all at the bottom of the planning and scoring spectrum.

The pricing concepts have been designed to try and limit the disparity between making money. For example, flying scheduled flights in Belize in a Cessna 182 or 208 between islands versus a 747 trek across the pond. If you make $200 on a Cessna 182 flight, you won't make $1 million in a 747 doing the longer route. This means that planes should be flown for their intended purposes.

## IMPORTANT:

Profit margins become thinner the heavier the aircraft and farther you fly it. For this reason, you better make sure you are spot on with fuel estimates, planned route and flying the plane for its intended purpose. Of course, this would be expected of anyone venturing into the complex nature of such planes. The larger the aircraft, the higher the financial risks. This is especially true if the flight planning is not executed accurately. This is the reason why most large and complex aircraft are flown by ATP (Airline Transport Pilots). Keep in mind you don't always make money and sometimes this is out of your control (diversions, unexpected weather conditions, holding patters etc.). This is true for the real world. Latitude is based around real world economic environment variables that simulate real world costs and behaviors.

## OPERATIONAL COSTS

Operational costs are another expense the pilot encounters when taking the plane out of the hangar. These costs are associated with everything not included in the fixed or fuel costs. Operating costs are based on ***per hour*** costs to operate the plane. The hourly cost to operate a plane is correlated to the skill level of a pilot. Nominally the Operating Cost is 1% of the Maximum Takeoff Weight (MTOW) for the first hour of flight and .5% for each additional hour. This relates to the real world 'cycle costs' of airplane use. Operational cost wise, a takeoff and landing is considered a cycle. The number of cycles is more important than the number of hours flow during the cycle. This translates to lower operating cost average for flights over 1.0 hours in duration. To calculate, add one hour to your flight time and multiple by .5% MTOW.

The operating cost is then modified (divided) by your skill level of the flight just completed (not your rolling average Career Skill Score). The **Skill Score** modifier is based on the real world maintenance of an aircraft. The worse you fly an aircraft the more you have to pay to maintain or repair the aircraft. Smashing into the ground with high descent rate at touchdown will drive down your overall flight skill score which translates to higher operating costs to buy new landing gear.

**First Hour : Operation Costs Per Hour = 1% MTOW / Pilot Skill %**
**Additional Hours : .5% MTOW / Pilot Skill %**

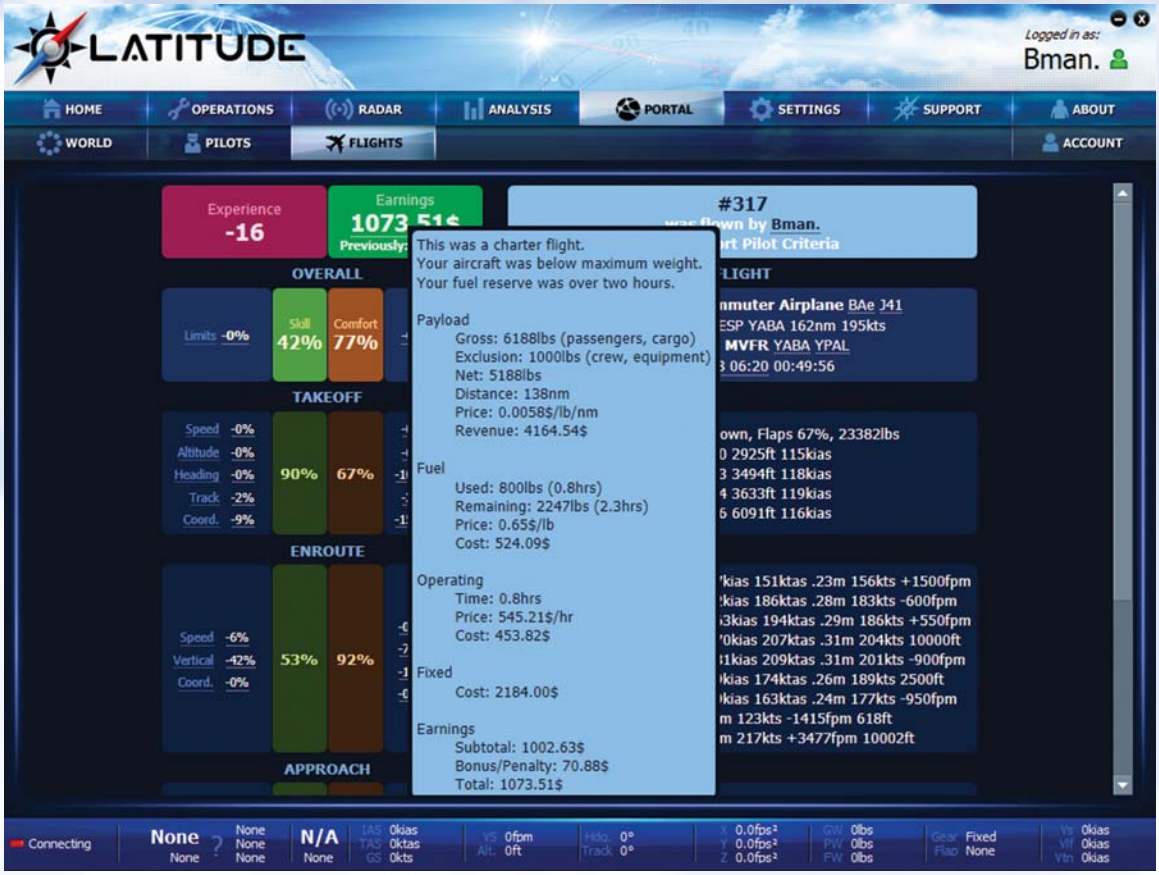
| | Operational Costs Per Hour ((1% MTOW) / Pilot Skill %) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1% of MTOW | | *1000* | *3125* | *6250* | *12500* | *25000* | *50000* | *100000* | *250000* | *500000* | *1000000* |
| | 1% Op. Cost | $10.00 | $31.25 | $62.50 | $125.00 | $250.00 | $500.00 | $1,000.00 | $2,500.00 | $5,000.00 | $10,000.00 |
| | | | | | | | | | | | |
| Pilot Skill | 100.00% | $10 | $31 | $63 | $125 | $250 | $500 | $1,000 | $2,500 | $5,000 | $10,000 |
| | 75.00% | $13 | $42 | $83 | $167 | $333 | $667 | $1,333 | $3,333 | $6,667 | $13,333 |
| | 50.00% | $20 | $63 | $125 | $250 | $500 | $1,000 | $2,000 | $5,000 | $10,000 | $20,000 |
| | 25.00% | $40 | $125 | $250 | $500 | $1,000 | $2,000 | $4,000 | $10,000 | $20,000 | $40,000 |
| | 10.00% | $100 | $313 | $625 | $1,250 | $2,500 | $5,000 | $10,000 | $25,000 | $50,000 | $100,000 |

As you can see in the Operational Costs chart above, your Skill Score of a flight has a big impact on the operating expense. If you fly well the cost to maintain the plane is less. Halve your skill score and you will pay 2x operating costs. Halve it again and you will be paying 4x more to fly the plane.

**OPERATIONAL COSTS** *(continued)*

Continuing the example from the same flight from above, the MTOW of the Jetstream 41 is 24,000 lbs. 1% of this MTOW is $240 per hour. This base operational cost is then modified by the overall **skill score** of the flight. In this case the pilot earned an overall score of 42%. The operational costs is then calculated $240 per hour $240 / .42 skill score = $571.43 * .8 hour flight time = $457.14 total flight operating cost.

Again, the displayed numbers for scores are rounded for ease of viewing. The actual Skill Score was likely just slightly higher, around 42.3%.

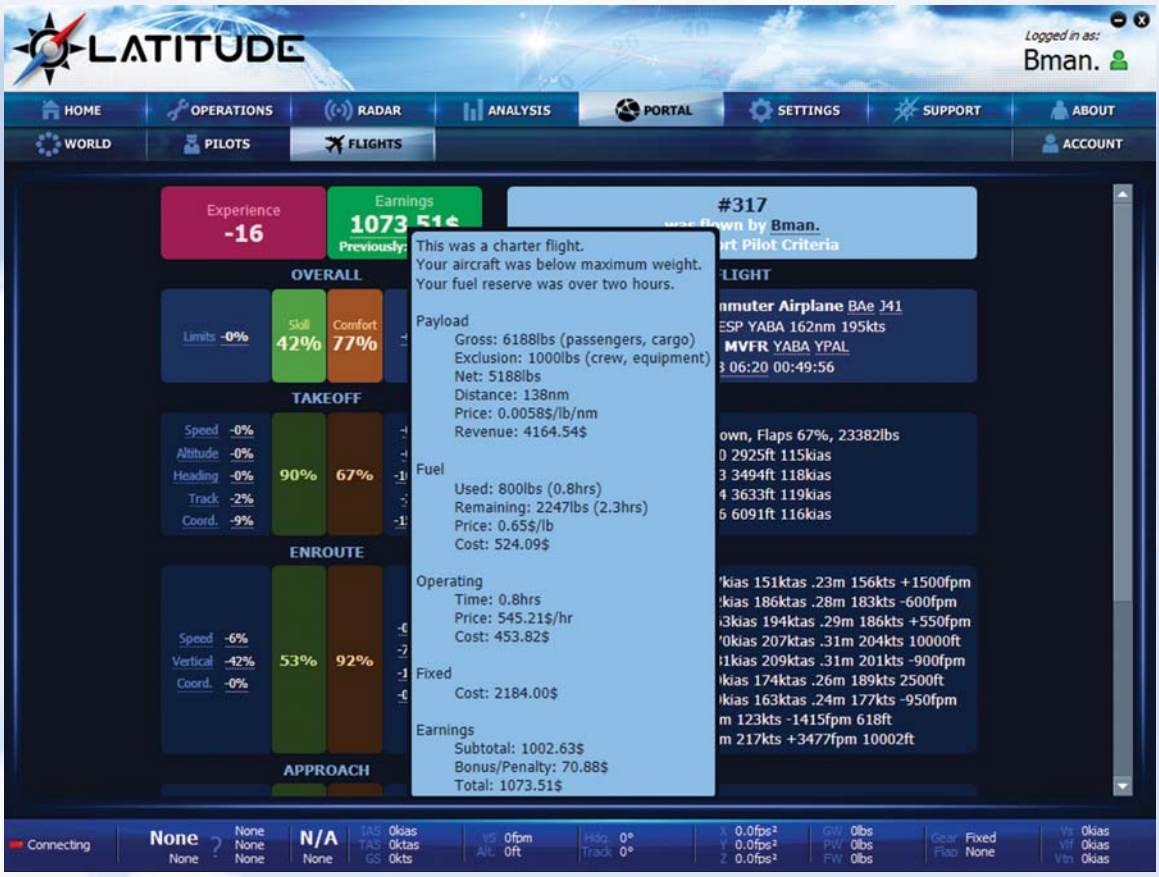


## FIXED COSTS

Fixed Costs are associated with real world insurance, storage and administrative costs of aircraft. There costs are relative to the pilots Career Level and plane class (weight). In the real world, less experience generally equates to less flying. However fixed costs are indifferent of the amount of time flown. This is why a Student pilot's fixed costs are much more than an Airline pilot's fixed costs. You have to climb the career ladder to get past the hardships. Think of these as startup costs for your business. You may initially lose money because of these costs. Keep this in mind when you jump into a Boeing 747 when you first start your career. Not only will you will be paying a lot more money to utilize the plane based on aircraft weight but if you are a student pilot, you will pay an exorbitant amount to cover the cost of a new pilot getting behind the controls of a complex plane. As you climb the Career ranks in Latitude, your fixed costs will begin to diminish as you are more skilled and qualified to fly larger and complex planes. Don't let this discourage you from taking an MD-11 up on your second flight; just know that much of your generated revenue will be handed over to insurance carriers. Below is a table depicting what you can expect to pay in fixed costs as your career level climbs from Student Pilot to Airline Pilot. The fixed costs range from 10% of MTOW at Student Pilot and drops to 1% of MTOW at Airline Pilot, but non-linearly.

| Career Levels | | | Fixed Costs (MTOW / Career Level) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *1000* | *3125* | *6250* | *12500* | *25000* | *50000* | *100000* | *250000* | *500000* | *1000000* |
| | Student | *0* | $100 | $313 | $625 | $1,250 | $2,500 | $5,000 | $10,000 | $25,000 | $50,000 | $100,000 |
| | Sport | *1* | $91 | $284 | $569 | $1,138 | $2,275 | $4,550 | $9,100 | $22,750 | $45,500 | $91,000 |
| | Private | *2* | $73 | $228 | $456 | $913 | $1,825 | $3,650 | $7,300 | $18,250 | $36,500 | $73,000 |
| | Commerical | *3* | $46 | $144 | $288 | $575 | $1,150 | $2,300 | $4,600 | $11,500 | $23,000 | $46,000 |
| | Airline | *4* | $10 | $31 | $63 | $125 | $250 | $500 | $1,000 | $2,500 | $5,000 | $10,000 |

**FIXED COSTS** *(continued)*




**Calculation: 24,000 lbs (MTOW) * 9.1% Sport Pilot Rate = $2184.00**

From the example, you can see that the Fixed Cost for a Sport Pilot is 9.1% of the aircraft's MTOW. In this example, the plane flown was a BAe Jetstream 41 with a MTOW of 24,000 LBS. This value can be found by clicking the aircraft type on the right side of the page Flight page.

This fixed cost expense is taken right off the earnings bottom line. The only thing you can do to diminish this fixed cost is to fly better and advance your career level. This is important to note because it could be one of the larger expenses incurred for your flight, next to fuel costs.

### BONUSES & PENALTIES

The expenses have been paid, the revenue has been generated – what do you get for continually being a stellar pilot or plane wrecker time and time again? You get bonuses or penalties tacked on for each flight bases on your overall pilot ***Reputation*** to total out your flight Earnings. Pilots who continually excel will be rewarded. Pilots who fail to perform well on a regular basis will be penalized.

The **Bonus/Penalty** engine is simple:

**Bonus/Penalty = Sub-Total Earnings * Reputation**

Reference the example flight above. After all flight revenue and expenses were tallied, the sub-total was a -405.06$ Loss. Unfortunately for this pilot, their reputation was right around +0 meaning there was not much bonus / penalty applied to the sub-total. If after future flights the pilot's reputation climbed to +50 the flight earnings would enhanced nicely. This example would look then look like:

**+50 Pilot Reputation**

Earning Sub Total ($ -405.56) * .5
Bonus = $202.78

**Total Earnings = $ -202.75**

As you can see, the reputation of a pilot can greatly impact the Earnings total. What this does is smooth out any spikes in the pilot's performance from their typical flying skills. Pilots have "off days" where they just don't nail all aspects of the flight. This doesn't mean the pilot is bad but rather they just had a bad day or flight. Conversely, pilots who continue to perform poorly in many flight scoring metrics are penalized even if they happen to have a great (or lucky) flight. Now let's say the pilot has a -50 reputation.

**-50 Pilot Reputation**

Earning Sub Total = Absolute ($405.56) * -.5
Penalty = $ -202.78

**Total Earnings = $ -608.34**

Penalties hurt the bottom line. Continue to learn and improve your flying skills and eventually your Reputation will improve and you will receive bonuses.

In closing to the Economy section of this guide, it's important to understand Pilot Career Level, Skill & Comfort Scores, plane weight class and Reputation all have some direct impact to your Pilot Earnings. There is no one quick scheme to make a lot of money – it will take aircraft knowledge, forethought, planning, execution, sound judgment and consistency to make the Economy work in your favor. As the scoring criteria becomes increasing difficult, both skill and comfort, climbing the career ranks, your opportunity to make money also becomes increasingly more difficult. Although your fixed costs decrease, the skill score criteria that drives the operating becomes more stringent in tandem with the career. You might have lower expenses but your revenue opportunity is based on a more scrutinizing audience.

### TIPS TO THE LATITUDE ECONOMY

- Maximize your payload. Take as much payload the plane, temperature and runways will allow
- Make sure you have enough fuel to land with the 1.0 hour of reserve fuel
- In flying jets, go higher so you burn less fuel. Typically jet engines perform better at cooler temps
- Fly planes according to the manufacturer's published optimized configurations
- Plan your route carefully to be as direct as possible
- Be consistent with your flights to achieve/maintain a positive Reputation to be awarded bonus pay
- Patterns can be a quick way to build reputation to offset losses

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